Vol. XLIII DECEMBER, 1931 No. 4

THE WILSON BULLETIN

A Magazine of Field Ornithology

Published by the
WILSON ORNITHOLOGICAL CLUB
at
SIOUX CITY, IOWA

Entered as Second-class Mail Matter, July 13, 1916, at the Postoffice at Sioux City, Iowa, under Act of March 3, 1879.

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Published quarterly, in March, June, September, and December, as the official organ of the Wilson Ornithological Club, at Sioux City, Iowa.

The current issue of the Wilson Bulletin is printed by the Verstegen Printing Company, Sioux City, Iowa.

The Wilson Bulletin is sent to all members not in arrears for dues. The subscription price is $1.50 a year, invariably in advance, in the United States. Outside of the United States the subscription rate is $2.00. European Agents, Dulau and Company, Ltd., 34-36 Margaret St., Oxford Circus, London, W. 1., England.

All articles and communications for publication, books and publications for notice, and exchanges, should be addressed to the Editor.

New subscriptions, changes of address, and applications for membership should be addressed to the Secretary. Personal items, news of events in the scientific world, and other notes suitable for our "Notes Here and There" department may also be addressed to the Secretary.

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THE WILSON ORNITHOLOGICAL CLUB

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THE WILSON BULLETIN

A QUARTERLY MAGAZINE OF ORNITHOLOGY

Published by the Wilson Ornithological Club

Vol. XLIII DECEMBER, 1931 No. 4

Vol. XXXVIII (New Series) Whole Number 157

THE STATUS, BREEDING RANGE, AND HABITS OF MARIAN'S MARSH WREN

BY H. E. WHEELER

Though we are primarily concerned with the occurrence of Marian's Marsh Wren in Alabama, and especially with its breeding habits, heretofore so little understood, our discussion will necessarily lead us into an examination of the Florida records, and of the status of those birds on the Atlantic seaboard that have been treated at one time or another under the name of "*marianae*".

We shall confine our treatment to the facts which have recently come to our notice and to the analysis of all published records of this species. There remains a great deal of work to be done, not only on the west coast of Florida and in Alabama, but particularly in all the marsh regions of South and North Carolina. This paper is presented in the hope that many observers will be prompted to make careful records of all marsh wrens in their territory.

After considerable correspondence about our Alabama marsh wrens it became evident that the question as to the breeding range of *Telmatodytes palustris marianae* in Alabama could be settled only by personal investigation. Such an investigation among the inaccessible marshes would not be possible by land. Access to the shallow waters around Mobile Bay and an examination of the tidal flats and marshes of the mainland and islands could be had only with a small vessel that could anchor in shallow water and thus allow frequent trips to the shore in a skiff. Had it not been for the exceptional courtesies shown me by Captain W. H. Edwards and his wife, of Fairhope, Alabama, the objectives of our expedition to the Gulf Coast of Alabama would never have been realized.

Captain Edwards put at our disposal for the week of June 14-20, 1931, his thirty-five foot yacht, the *Osprey*, which he himself built after the model of the *Islander*, a yawl-rigged vessel, in which Captain Harry Pigeon made his famous trip around the world. The Captain evidenced his skill not only as shipbuilder but also as navigator, for

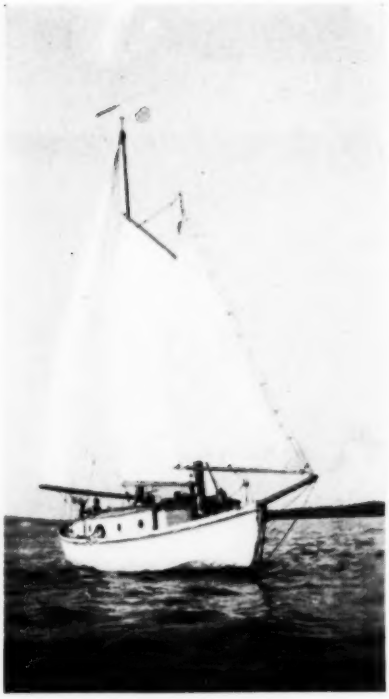

FIG. 46. The Osprey. The thirty-five foot yacht in which the expedition sailed for the breeding grounds of Marian's Marsh Wren.

he had a perfect knowledge of Mobile Bay and the Gulf shores and of their many bars and islands. In the party were the Captain's wife, well posted on the birds of the coast, his 15-year-old son Dan, Homer Flagg (a high school graduate), my wife, and our little daughter Edith. The *Osprey* was our home for the entire trip. We visited practically the entire coast of Alabama, every hour of daylight being utilized in field work ashore, or in sailing to the next anchorage.

The map will indicate the course of the yacht and the several places visited, every marsh or island offering any possibility of finding breeding marsh wrens being investigated. Beginning our course at Fairhope, we surveyed in succession Week's Bay, Navy Cove, Isle aux Herbes, Bayou La Batre, Marsh Island, another section of Isle aux Herbes, Berron Point on Mon Louis Island, Heron Bayou (where we found breeding wrens in considerable number), and the eastern and western ends of Dauphin Island. Limitation of time forbade our investigation of Cat Island, Petit Bois Island, and the extensive marshes of the Mobile River delta, but an auto trip from Fairhope down the east coast of Mobile Bay to Gulf Shores yielded some important information.

I. Marian's Marsh Wren in Florida

Before presenting our findings as to the breeding of Marian's Marsh Wren in Alabama it is proper to review the history of the species beginning with the notes of its discoverer, W. E. D. Scott. As we shall see, subsequent observers have given us but glimpses of the bird, and we are not sure that they correctly identified the birds which were reported under the name of *marianae*.

Marian's Marsh Wren was first discovered and described by W. E. D. Scott in 1888, his description being published in the *Auk*

FIG. 47. A small bayou penetrating the marshes of West Heron Bay, Mobile County, Alabama. Typical breeding grounds of Marian's Marsh Wren. June 18, 1931.

FIG. 48. Typical breeding grounds of Marian's Marsh Wren. Heron Bayou, in Mobile Bay. June 18, 1931. Photographs by H. E. Wheeler.

(Vol. 5, p. 7) under the caption, "Supplementary Notes on Florida Birds". The new marsh wren was assigned to the genus *Cistothorus.*

In this article, Mr. Scott says: "The great difference between this species and *palustris* is in the conspicuous barring of the upper and under tail-coverts and the feathers of the flanks, and olive instead of rufous brown coloring throughout, with the much darker coloring of underparts.

"The new bird is quite common on all the salt marshes of this immediate vicinity (Tarpon Springs), and probably all along the coast of Florida as far north as Cedar Keys, where it is known to occur. It is probably resident and breeds, though of this I have as yet no positive knowledge".

In the Bulletin of the Nuttall Ornithological Club for 1881 (Vol. 6, p. 15), Scott reported the Long-billed Marsh Wren (*Telmatodytes palustris*) as "abundant in the salt marshes at the mouth of the Withlacoochee River".[1] The date of this observation is January, 1879, just nine years prior to the naming of *marianae.* In 1888, in his article naming *marianae*, Scott made no reference to this Withlacoochee habitat; but he did state that both *palustris* and *marianae* were associated together at the same season of the year (January), and that *marianae* was the predominant species. In all probability, then, the records of *palustris* in Citrus County in 1879 included *marianae;* and if so, this would be the earliest published reference to the wren that Scott separated in 1888.

In 1893 Scott listed his new species as a *migrant* in the Caloosahatchee region, which region is more than one hundred miles south of the Anclote Keys, and he reported that "enough representatives remain during the winter to allow the species to be regarded as resident".

In 1893, (*Auk*, Vol. 10, pp. 218-219), William Brewster separated from *palustris* a much lighter form of marsh wren from Georgia under the subspecific name, *griseus;* and in giving the measurements of ten specimens of his new subspecies, he added the measurements of an equal number of *marianae*, which he states were "selected at random from the large series" of specimens before him. Presumably these *marianae* were collected from the type locality on the west coast of Florida, but whether by Scott or by himself is not apparent. This new subspecies was called Worthington's Marsh Wren in honor of its discoverer, Mr. Willis Woodford Worthington.

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[1]The Withlacoochee River, which empties into the Gulf of Mexico, is between Levy and Citrus Counties, its mouth being approximately sixty miles north of the Anclote Keys. This region is now known to be a typical habitat of *marianae.*

In 1902 (*Auk*, Vol. 19, p. 353) Outram Bangs reported that *Cistothorus marianae* was an inhabitant of the "salt marshes of western Florida, non-migratory".

In the Twelfth Supplement to the A. O. U. Check-List (*Auk*, Vol. 20, p. 357, 1903) Marian's Marsh Wren is registered under the name *Cistothorus marianae*, but in the Thirteenth Supplement (*Auk*, Vol. 21, p. 418, 1904) the bird is reduced to subspecific rank because it was found to intergrade with *palustris*, and it is assigned to the genus *Telmatodytes*. This is based on Oberholser's report in the Proceedings of the Biological Society, Washington, Vol. 16, p. 149, 1903.

In 1906 (*Auk*, Vol. 23, p. 67) Wayne's article on South Carolina Birds entered a protest against *his* Atlantic Coast "*marianae*" being reduced to subspecific rank, and took issue with Bangs as to the non-migratory character of the Floridian *marianae*. Wayne was firmly of the opinion that the Florida birds were migratory and inseparable from the South Carolina birds which he reported in 1899.

Our next references, chronologically taken, are in reports of several Christmas censuses made at Palma Sola, near Bradenton, in Manatee County, Florida. The first of these was by Eleanor Earle, in 1908; the others by Carlos Earle, in the years 1909, 1910, and 1912, respectively. These reports appear in order in *Bird Lore*, Vol. 10, p. 33; Vol. 11, p. 28; Vol. 12, p. 30; and Vol. 14, p. 33. Two birds were observed in each census taken, except that of 1912, when three birds were noted, making a total of nine birds for the four years. If the identifications are correct, the range of Marian's Marsh Wren is carried considerably farther south of the type locality. Whether these birds were only straggling migrants, or individuals belonging to wintering flocks, is not apparent; but since they were observed for four winters during a period of five years the presumption is that they were regularly wintering in the region.

In 1919, "John Williams"[2] published a paper on the birds of Wakulla County, Florida, in the WILSON BULLETIN (Vol. 31, p. 56) in which he listed Marian's Marsh Wren as abundant in the broad salt-water marshes of the coast. In the following year he again listed Marian's Marsh Wren in his "*Notes on the Birds of Wakulla County, Florida*" (WILSON BULLETIN, Vol. 32, p. 56).

In 1924, Frank M. Chapman, in the revised edition of his "*Handbook of the Birds of Eastern North America*", p. 481, published the

[2]The *nom de plume* of C. J. Pennock. For a time he was a resident of St. Marks Lighthouse, in Wakulla County, Florida, where his observations were made.

winter range of Marian's Marsh Wren as (in part) the west coast of Florida.

In 1926, William G. Fargo, in his "*Notes on the Birds of Pinellas and Pasco Counties, Florida*" (WILSON BULLETIN, Vol. 38, p. 155) reported Marian's Marsh Wren as abundant in the salt marshes west of Elfers. This locality is indicated on the map. Mr. Fargo further stated that male birds were singing "vigorously" on April 5, which would almost certainly identify the habitat as a preferred breeding area.

In the same year, 1926, Worthington and Todd (WILSON BULLETIN, Vol. 38, p. 228) reported Marian's Marsh Wrens in the marshes of Choctawhatchee Bay, which is mostly in Walton County, one of the West Florida counties. They state that a pair of these wrens were shot on April 18, presumably of that year; but they state also that "these birds" (meaning probably similar specimens) were examined some years previous to that time by Dr. Harry C. Oberholser and identified as Marian's Marsh Wren. They do not state whether the birds Oberholser had in hand came from Choctawhatchee Bay region or not.

Mr. Francis M. Weston, in a letter under date of June 29, 1931, states that Marian's Marsh Wren cannot be listed from the Pensacola region, except as a winter visitor.

In a letter from Mr. C. J. Pennock under date of July 7, 1931, Marian's Marsh Wren is reported as having been taken on April 13, 1921, at Punta Gordo, in Charlotte County, Florida. Evidently more than one species of marsh wren is found at this season in this locality. On April 11, 1923, Mr. Pennock reports finding a nest of Marian's Marsh Wren about a mile from Punta Gordo, "up Peace River". The nest was new, and nearly completed. Mr. Pennock states that there are abundant marshes along the tidal creeks of Charlotte Harbor, but he does not know what marsh wrens could be identified as breeding in them. Perhaps this single nest, at that time unoccupied, and without a specimen of the bird, would be insufficient to base any conclusion on, but it would not be surprising to learn that even this southernmost section of the range af *marianae* is also a breeding habitat.

As to the breeding range of Marian's Marsh Wren in Florida, Mr. Donald J. Nicholson, of Orlando, Florida, in a letter under date of May 23, 1931, furnishes me some very interesting facts:

"I do not know just how far north along the Gulf Coast this species breeds, but it is found west and southwest of New Port Richey, Pasco County, Florida, and breeds in late April through June, and probably a few continue into July.

"The birds in this vicinity (New Port Richey) nest among Juncus (*J. roemerianus*), a sharp-pointed rush, and principally in mangrove trees from five to fourteen feet above the mud in salt marshes. The tree-nesting may seem strange to you and it was quite a surprise to me when I found them nesting under such odd circumstances. I think high water and rats had something to do with this nesting custom here, and it may be a comparatively recent habit. The sets range from three to five, but sets of five are not as commonly found as the smaller sets.

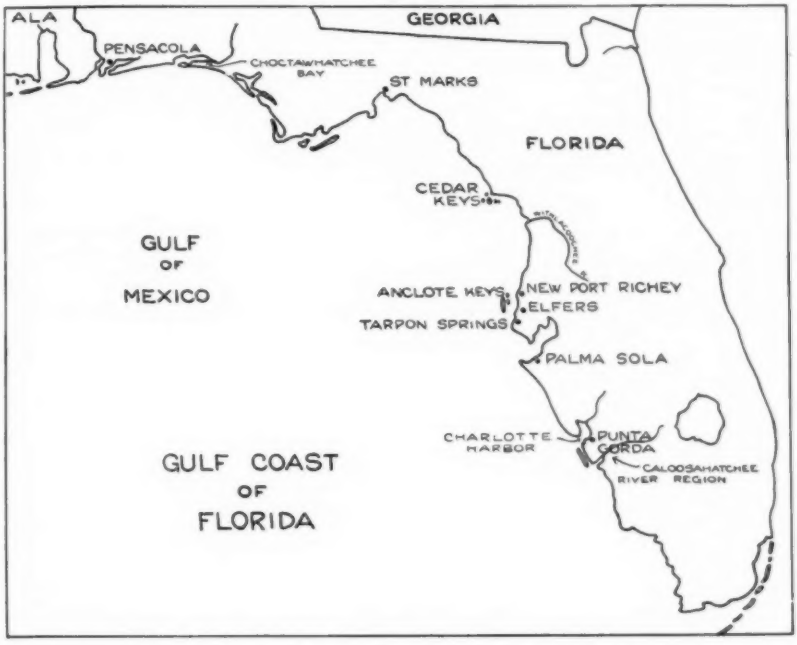

FIG. 49. The Gulf Coast Range of Marian's Marsh Wren.

"The bird may nest anywhere along the Gulf Coast in suitable marshes and it should be found at or in the vicinity of St. Marks, and at New Port Richey was found within a few yards of the open Gulf. This latter point may aid you in looking for nests".

The following facts are also derived from the notes of Nicholson, and constitute the only information we have concerning the construction of the nest of Marian's Marsh Wren and the character of the eggs.

The nest of *marianae* does not differ from that of *griseus* (which does not occur on the Gulf Coast) either as to materials used in its construction or as to size and appearance. On the inside, and on a level with the entrance, there is a small shelf or platform, extending a

little on each side of the entrance, and so constructed that it is impossible for the eggs to roll out, or for them to be blown out when the nests are swayed by the stiff sea breezes. In collecting the nests and eggs it is necessary to turn the nest upside down, allowing the eggs to roll around to the top and down on the smooth side of the nest to the opening at its upper side. Only in this way can the nest be taken without injuring the little interior projection below the entrance. This peculiarity in the construction of the nest is found also in the nest of *griseus*. Nests of *marianae* found in mangrove trees were fastened to the forks of small limbs, generally at their ends, or in the tops of small mangrove bushes.

The top of the nest is usually larger than the bottom, and in a majority of nests examined, the opening is about one-third of the way from the top. The entrance to the nest is so small that it is with difficulty located, especially in the case of those newly constructed. Occupied nests are lined with soft shredded grasses, and sometimes with feathers, and they are so cleverly woven together that they are a complete protection against rain. None have even been found that were damp inside. Although the marsh wrens nest in colonies, the nests of *marianae* are seldom less than forty feet apart. On the east coast of Florida Nicholson counted four to six "dummy nests" to every occupied nest of *griseus;* but in the colonies of *marianae* on the west coast near Elfers, he found only one or two bachelor nests to one that was occupied.

The male bird is invariably found singing near the occupied nest, either in the same tree, or in the grass very close by. He is the collector's best guide to the location of the nest. The females are so suspicious that they never have been observed to enter or to leave the nest. Mr. Nicholson once touched a nest with young birds in it, and they darted out like winged bullets. It is probable that when they are able to leave the nest they can fly and do not return to it. The collector may actually take the nest and eggs in the presence of the male, who continues to sing undisturbed only a few feet away.

The males of both *marianae* and *griseus* sing so much alike that they could not be identified by this test, although slight differences in their songs not easily remembered might differentiate them if they could be heard singing in the same locality. The song is delivered in the same manner by both wrens.

The eggs of Marian's Marsh Wren are identical in size, shape, and color with those of Worthington's Marsh Wren. There is much variation in color, however, some eggs being quite pale, but most of

them being of a deep rich chocolate brown. In some sets the eggs are without darker capping or wreathing of brown dots at the larger end. When the eggs are wreathed, which is true of a majority of sets examined, the dots are generally confluent. The eggs are sometimes glossy, always thick-shelled, and not easily broken in handling.

Fig. 50. Map showing the cruise of The Osprey in search of Marian's Marsh Wren.

In all these respects the eggs of Worthington's Marsh Wrens are the same.

II. Marian's Marsh Wren in Alabama

On our survey of the coastal region of Alabama we found no clue to the location of breeding marsh wrens until we got to Bayou La Batre. Mr. Willie Collier, an observant young fisherman, told us that he had seen plenty of "Grass Wrens" on Marsh Island, and at

Berron Point on Mon Louis Island.[3] A careful search through the marshes of Marsh Island gave negative results; for here, as elsewhere, the grass had been burned, creating situations that could have no appeal to marsh-loving wrens.

In addition to the frequent damage done to the grass by fires, marsh wrens must suffer many indignities from rats and mice, which are abundant in all salt marshes. Other birds, such as Fish Crows and hawks, probably invade their breeding grounds. High winds and tides doubtless wreck many of their nests. Should young birds climb out of the nest before they can manage themselves in the thick vegetation, or use their wings, they can but fall victims to their enemies.

As a further discouragement to the birds we found on Dauphin Island, whose former bars and sand spits are now continuous with the inhabited section, herds of cattle grazing over vegetation that seemed to offer the poorest prospect for a living. Many of the nesting colonies of terns and gulls, as well as those of Florida Nighthawks, must be repeatedly broken up by these cows. We saw some nests of Least Terns, Black Skimmers, and Florida Nighthawks, the eggs of the latter being laid almost in the trails of ranging cattle. On Petit Bois Island, which lies west of Dauphin, and which is uninhabited, immense colonies of terns and gulls formerly nested; but now wild hogs threaten the extermination of all ground-nesting birds. Petit Bois Island is partly in Alabama and partly in Mississippi. We learned that somewhat recently hunters from the mainland have been making raids on the hogs, since they are at least good for food. This commendable poaching, if we should call it that, may be the salvation of the birds at last.

Berron Point, although ideally adapted to the needs of the marsh wrens, yielded only a few singing birds but no evidence of their nesting. They were evidently on territory accepted as their own, but their nesting sites had been destroyed by the fires that the boys had kindled to aid them in finding the nests of Clapper Rails and Florida Gallinules. Roasted eggs of marsh birds may be a great delicacy for the "eggers", but they are a costly one if we consider the interests of Seaside Sparrows, marsh wrens, and Florida Redwings, to say nothing of the ground-nesting gallinules and rails.

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[3]In a letter, dated July 13, 1931, Mr. Collier enclosed a sketch map showing the following localities in which at various times in season he had found marsh wrens breeding: Marsh Island; Isle aux Herbes, east coast near the middle of the island; Pass o' Barrow, local name for Berron Point of Mon Louis Island; and the marshes of Fowl River, which are some distance north of Berron Point, in Mobile County. See map.

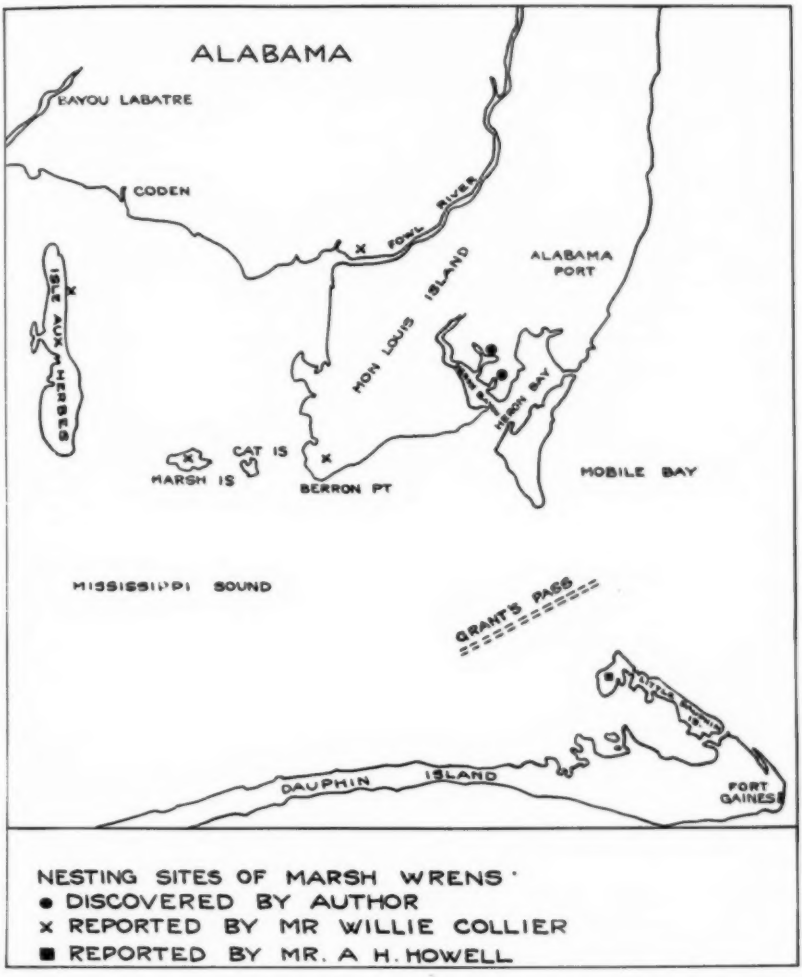

FIG. 51. Map showing known distribution of Marian's Marsh Wren in Alabama.

We did find on a low platform, sheltered by the small vegetation of a narrow ditch, the nest of a Green Heron. The birds in it were old enough to fly, so that it was with some difficulty that we captured one of them to make sure of our identification. In the brackish waters of this region, especially on the margins of the muddy bayous, we found great numbers of mollusks; mostly *Littorinas*, *Neritinas*, and the common bivalve, *Mytilus*.

It was on the tidal flats, or rather monotypic marshes, of Heron Bayou that we found marsh wrens nesting, enough to satisfy the heart

of any ornithologist. This region of vast and almost impenetrable marshes is known to the fishermen as West Heron Bay. Several narrow bayous penetrate the grass-grown region, one of them widening into a so-called lake. In such a region, in the tall bladed grasses, which grow higher than the rushes, and nearer open water, we found the marsh wrens numerous. They were singing near their neatly built nests, their entrancing songs being much in the tempo of the songs of the Prairie Marsh Wren.

It is not difficult to identify these marsh wrens, for their darker colors, especially those underneath, are good field marks. In hand, the birds had the characteristic black spots, which were obscured but little by the lighter markings of the feathers on the breast.

Contrary to our expectation, we did not find these wrens particularly shy.[4] The breeding birds were very easy to approach; and though they did not remain long on open perches they seemed quite unmindful of our invasion of their territory, singing joyously all the while, and often within two or three feet of us. Often and again the males would reappear and perch in plain view on the side of the tallest reed, and that without interruption of their song. If we could have walked through the thick vegetation at low tide with a Graflex camera, we might have gotten pictures of the birds in action. It was slow, sloppy work at best, getting into the habitats of the birds, especially when we left the skiff. Without doubt the search for nests developed that type of patience and perseverance which all members of our party came prepared to supply. At high tide, when a few pictures were taken of a nest and the habitat, a platform was improvised with life preservers spread over downturned rushes in order to give the camera tripod a footing. By this device a sufficiently good elevation was obtained for photographic work.

The nest of Marian's Marsh Wren differs in no essential way from the nest of other closely-related species or subspecies. It is globular in shape, well secured to the taller marsh grasses, and usually about two or three feet above high tide. Oftentimes the nest can be detected from a moving skiff. The bachelor nests, which are unlined, are in the proportion of four or five to one which is lined and occupied. One nest contained remains of eggs already hatched, which eggs were, as

[4]"This tiny wren is inconspicuous and easily overlooked by reason of its secretive habits. It dwells exclusively in the wet salt marshes, hiding most of the time in the dense tangle of rushes and marsh grass. . . . But usually the birds are very difficult to detect as they flit about under cover of the rank vegetation." Howell, *Birds of Alabama*, p. 338. Perhaps Howell intended this description to apply to individuals under observation in seasons other than the breeding season.

far as color is concerned, like those of *Telmatodytes p. palustris* or *T. p. griseus*. We were unable to secure more data on the eggs, since all of the nests examined either had young birds in them, or were empty. Many young birds were, at this time (June 18) old enough to fly.

Mrs. Edwards banded one of these half-grown birds, this making the first instance, as far as I can learn, of the banding of a Marian's Marsh Wren in Alabama. She also banded five birds, which were taken from the nest. This nest was located about three feet above the water (high tide) on the margin of one of the smaller bayous leading off from Heron Bayou. After the birds were banded the nest was photographed.

The beginning of the nesting season, estimated by the conditions as we found them, is probably May 20, perhaps even earlier. In all probability the season continues well into June. We could not tell whether the birds raise more than one brood or not. If so, the second nestings can hardly be dated earlier than the middle of June.

Marian's Marsh Wren cannot be reported as a rare bird in the locality cited above. It is evidently abundant in the region where it was first discovered, Pasco and Pinellas Counties, Florida, but it remains to be ascertained whether it is more than a casual visitor, or resident, in many of the localities shown on the map and listed in the table. We did not visit the extensive marshes at the head of Mobile Bay, which belong to the delta of the Alabama and Tombigbee Rivers, whose larger channels are known as Mobile River and Tensaw River, respectively. In exploring this section during the breeding season, Howell found the wrens abundant, but though he saw nests he found none that were occupied. Since he recorded the wrens as present in this region during the winter, it is evident that they are permanent residents in this part of Alabama. Howell states that Gutsell found the birds in winter near Orange Beach, and that he himself found them in the same region on the Gulf at Bon Secour. Howell further reports finding a Marian's Marsh Wren, but no nests, on Little Dauphin Island[5], in June. He did not find the species in the marshes about Bayou La Batre or on Grand Batture Island.

[5]At the time Howell visited Dauphin Island, it was broken in many places by bars and channels, which still appear in the official maps of that region. At this writing the island is continuous from end to end, a distance of fourteen miles, and is seldom overflowed by tides except in a season of storms. Little Dauphin Island is a much smaller island lying north of the eastern section of Dauphin Island.

It becomes apparent that the territory of *marianae* is almost continuous from the head of Mobile Bay and the coastal and island marshes of Alabama to Manatee County, Florida, wherever suitable habitats are available. The Caloosahatchee region, reported by Scott as a winter home for this species, is a considerable distance from the localities in which it is abundant; but whether the birds are only migrants or regular winter visitors in this region cannot be confidently stated.

The accompanying map correlates these several reports and indicates the need of careful observations of *marianae* all along the Florida Gulf Coast, both in the breeding season and in the winter. It can thus be stated, with some confidence, that Marian's Marsh Wren is a permanent resident of the coastal marshes of Alabama and Florida all the way from Isle aux Herbes and upper Mobile Bay to New Port Richey in Pasco County, Florida*; and that it is a migrant, or a winter visitor, in Manatee County, and in the Caloosahatchee River region.

III. Marian's Marsh Wren on the Atlantic Coast

Our next problem will be to examine the records which mention Marian's Marsh Wren as an inhabitant of the Atlantic seaboard.

In 1891, Robert Ridgway's paper, entitled *Cistothorus Marianae . . . in South Carolina*, appeared in the *Auk* (Vol. 8, p. 240). This record, however, must be referred to *griseus*, a subspecies described by Brewster in 1893. (See *Auk*, Vol. 10, p. 218). In the *Birds of South Carolina*, by Wayne (1919, p. 187), in the discussion of Worthington's Marsh Wren, this correction is made. The report of Marian's Marsh Wren from Sapelo Island, Georgia, made by Brewster (*Auk*, Vol. 5, p. 432, 1888), is also corrected to read *griseus*. Mr. Wayne adds: "There is no evidence that *griseus* interbreeds with *marianae*, and I think it should be given full specific rank".

Since Wayne was fully acquainted with *griseus* from his boyhood, this statement has a significant bearing on the disposition of the (so-called) *marianae* in South Carolina; for if *marianae* cannot be admitted as a valid species for the Atlantic seaboard may not these so-called *marianae* be another form of *griseus*, or more probably an unnamed species similar to the true *marianae* but having a range altogether different?

In 1899, Arthur T. Wayne published in the *Auk* (Vol. 16, pp. 361-362) his article entitled, "Notes on Marian's Marsh Wren (*Cistothorus Marianae*) and Worthington's Marsh Wren (*Cistothorus palustris*

*South of Pasco County marshes are scarce, and this explains the absence of marsh wrens.

griseus)". Several statements made in this account focus on our investigations:

1. Wayne reports taking a wren near Mt. Pleasant, S .C., on April 16, 1897, which Ridgway declared was an intermediate form between *marianae* and *griseus*, but which he considered finally as "an exceptionally dark specimen of *griseus*".

2. The same specimen, when examined by Brewster was confidently identified as *marianae*.

3. Both of these authorities had before them a series of specimens, in which both *griseus* and *marianae* occurred.

4. Accepting as valid the opinion of Brewster, Wayne claimed this record was the first to extend the range of the species "to the Atlantic Coast".

5. Wayne then followed with the statement that Marian's Marsh Wren was an abundant bird in South Carolina "during the migration" season, giving dates upon which he had collected specimens; namely, from October 4 to May 8. He further stated that "this wren does not breed anywhere near Mt. Pleasant, but is simply a migrant".

Wayne further predicted the breeding range of Marian's Marsh Wren on the coast of North Carolina!

7. When Wayne took notice of Mr. T. Gilbert Pearson's report in the July issue of the *Auk* (Vol. 16, p. 250, 1899) a specimen collected at Beaufort, N. C., had been identified as *griseus* by Mr. Ridgway. When, however, Wayne received this specimen from Pearson, he declared it to be a typical example of *marianae*.[6]

Apparently nothing more developed in the situation until 1910, when Wayne published his "*Birds of South Carolina*", on pp. 188, 189 of which he reviews the history of the species. He states with confidence that the breeding range of *marianae* does not include Florida, "as Scott supposed", but that it is North Carolina. He does not admit South Carolina as other than a migrant range for *marianae*, but at this point a curious situation is discovered. A male and female wren, identified as Marian's Marsh Wren, taken in 1896 in South Carolina, are described as being *much darker above and below than specimens of the same species taken in Florida*. The North(?) Carolina specimens, on the contrary, are described as normally lighter than those from Florida!

In view of these statements we infer that the Atlantic Coast birds are *not* migrants from Florida, nor can they be identified as Marian's

[6]The reference of Bishop in the *Auk* (Vol. 16, p. 268, 1901) to the marsh wren that he took on Pea Island in North Carolina in February, 1901, must, of course, be referred to *griseus*.

Marsh Wrens. We are forced to the conclusion, previously expressed, that they will classify as a form of *griseus* or as a new species.

A factor in reaching this conclusion appears in Wayne's own statement that Marian's Marsh Wrens reach the vicinity of Charleston, S. C., *about the second week in September and that they remain until about the first of November.* Either he was under the impression that these migrants passed through South Carolina *from* Florida on their way to North Carolina, or that they were migrants from North Carolina on their way *to* Florida. Apparently it did not occur to him that they might be migrants from North Carolina which winter on the Atlantic Coast, some of them in the vicinity of Charleston, but the majority finding more congenial winter homes either north or south of Charleston. The evidence is that these birds do not migrate *to* Florida, or *from* Florida.

If we accept the theory that Marian's Marsh Wren migrates from Florida to, or through, South Carolina *after the breeding season*, we shall have a new factor to deal with in the general problem of migration. Why is it that there are no families of birds that feature a northbound migration in search of a winter home? In some families, individuals or flocks may wander about for a time in almost any direction; but the birds that are given to such wanderings are, as a rule, permanent residents of the region. Among such wanderers are some species of herons and some birds of prey. The Pine Warbler is a striking illustration of this roaming habit.

The predilection for a winter home south of the breeding range applies not only to birds of the Northern Hemisphere, but it is apparently not reversed in the case of migratory birds in the Southern Hemisphere. It is impossible to be dogmatic on this point. The only thing that can be said is that there are available no records that contradict this supposition, neither in the keeping of the Biological Survey in Washington, nor in the literature of migration, as far as we have been able to examine it. Correspondence with ornithologists in Africa, Australia, and South America has not shed much light on the subject. There are surely some South African species that nest in the palaearctic regions, and migrate after the nesting season northward, but we are waiting confirmation of this assertion. Then there are birds which migrate in more or less of an easterly or westerly direction, but their choice of a winter home is generally in a latitude south of their breeding grounds.

This digression has little bearing on the discussion of Marian's Marsh Wren. However, it would be a most interesting thing if this

species could be the first one among migratory birds of North America to be reported as immediately seeking a northern clime for its winter home after the nesting season. There are accumulating reasons for making the supposed Marian's Marsh Wren of the Atlantic Coast a different bird from the Marian's Marsh Wren of the Gulf Coast, and for believing that the latter is a permanent resident in most of the marshes where it is found, migrating perhaps from some of its breeding habitats in Florida to the more southern Caloosahatchee River region.

In 1924, Dr. Frank M. Chapman, in the revised edition of his *Handbook of the Birds of Eastern North America*, p. 481, states that the breeding range of Marian's Marsh Wren is the coast of North Carolina, and that it winters in South Carolina and along the west coast of Florida. In variance with this statement he gives a breeding record for the species on the *east* coast of Florida: "Mantanzas Inlet, May 24". Chapman writes me that this record, however, can not now be traced. He further states that the Atlantic Coast species will have to be referred to *griseus*, which opinion I had already put in writing before receiving his letter.

Under date of June 30, 1931, I received a letter from Mr. A. H. Howell, in which he says:

"There is considerable doubt regarding the Atlantic Coast records of *marianae*, and quite likely these birds may prove to be a distinct race".

Following this came a letter from Dr. Chapman, under date of July 13, 1931, in which he says:

"In my letter of July 6th, the range of *marianae* was given from galley proofs of the forthcoming A. O. U. Check-List. On July 11th I received page proofs of this book, and therein the ranges of *griseus* and *marianae* are given below:

"*griseus*: Lower Austral Zone in the South Atlantic coast region from South Carolina to northern Florida.

"*marianae*: Gulf Coast from Charlotte Harbor,[7] Florida, to Mississippi.

This seems to be a more logical distribution".

In other words, the range of these two wrens as given in the forthcoming Check-List compares very well with the range which we have worked out after a careful analysis of available records and correspondence with local observers. It will be noted that records for the east coast of Florida do not materialize in the case of *marianae*.

[7]Charlotte Harbor lies in Charlotte and Lee Counties, Florida, a little north of the Caloosahatchee River region, already treated in the text.

TABLE I

Range of Marian's Marsh Wren in Florida and Alabama.

Region	*County and State*	*Season*	*Observer*
Mouth Withlacoochee River	Citrus Co., Fla.	Winter	Scott
Caloosahatchee River Region	Lee Co., Fla.	Winter, Migrant	Scott
St. Marks	Wakulla Co., Fla.	Winter	"Williams"
Elfers	Pasco Co., Fla.	Breeding	Fargo Donaldson
Choctawatchee Bay	Walton Co., Fla.	Breeding	Worthington and Todd
Pensacola	Escambia Co , Fla.	Winter	Weston
Tarpon Springs	Pinellas Co., Fla.	Winter Breeding	Scott Donaldson
Mouth of Anclote River	Pinellas Co., Fla.	Winter	Scott
Anclote River to Cedar Keys	West Coast, Fla.	Winter	Scott
Cedar Keys	Levy County, Fla	Winter	Scott
Palma Sola	Manatee Co., Fla.	Winter	Earle, Eleanor Earle, Carlos
New Port Richey	Pasco Co., Fla.	Breeding	Nicholson
Marshes Mobile River	Baldwin and Mobile Counties, Ala.	Winter? Breeding	Howell
Lower Tensaw River	Baldwin Co., Ala.	Winter Breeding	Howell
Orange Beach	Baldwin Co., Ala.	Winter	Gutsell
Bon Secours	Baldwin Co., Ala.	Winter	Howell
Little Dauphin Island	Mobile Co., Ala.	Breeding	Howell
Heron Bayou	Mobile Co., Ala.	Breeding	Wheeler
Isle aux Herbes	Mobile Co., Ala.	Breeding	Collier
Marsh Island	Mobile Co., Ala.	Breeding	Collier
Berron Point, Mon Louis Island	Mobile Co., Ala.	Breeding	Collier
Marshes Fowl River	Mobile Co., Ala.	Breeding?	Collier
Salt Marshes	West Coast, Fla.	Permanent	Bangs
Punta Gordo	Charlotte Co., Fla.	Breeding?	Pennock
Charlotte Harbor	Charlotte Co., Fla.	Winter Breeding?	Pennock

The statements found in Bailey's "*Birds of Florida*" (p. 139) add nothing to our findings, and therefore can be neglected; similarly those in Pearson and Brimley's "*Birds of North Carolina*", since they apply either to *griseus* or to a new species.[8]

Summary

With such meager records in hand it is presumptious to go further than to suggest that the birds of the Atlantic Coast which have been reported under the name of *marianae* are a new species, differing from *griseus* sufficiently to make identification comparatively easy.

The territory of the two birds as far as breeding is concerned seems to be distinct, the range of *griseus* being South Carolina to Florida (east coast), that of the supposed *marianae* being North Carolina. *Marianae*, however, migrates to South Carolina in winter.

Marian's Marsh Wren is distinctly a salt-water species, for with the exception of Scott's record of 1890, it has never been reported on any fresh-water marshes. Even in this case the fresh-water marshes were not far from salt water.

Marian's Marsh Wren is a coastal species, being unknown in the interior, even as a migrant. It has never been reported farther inland than ten miles, and that by Scott, as given above.

The range of Marian's Marsh Wren is the Gulf Coast of Florida and Alabama.

Marian's Marsh Wren is apparently a permanent resident in most of the situations in which it has been found. This applies particularly to the extensive salt marshes in Alabama, such as are found in upper Mobile Bay; and to salt marshes of the Florida west coast, the center of which is the type locality of Tarpon Springs.

There are several localities along the west coast of Florida which Marian's Marsh Wren visits in winter, Pensacola and the Caloosahatchee River region in Lee County having been reported specifically.

The nesting habits of Marian's Marsh Wren do not differ from those of the Long-billed Marsh Wren as regards the nest and the size and number of eggs.

Marian's Marsh Wren usually chooses a situation in all respects similar to that preferred by other marsh wrens. It is the only marsh

[8]A letter from Mr. Brimley, under date of July 11, states that the only record for Marian's Marsh Wren that has been made since 1919 is a bird taken on July 17, 1929, at Beaufort, N. C. At this writing, Howell's "*Florida Bird Life*" is in press, and doubtless will add information based on his personal observations in that state.

wren,[9] however, that resorts occasionally to trees, building in mangroves above the muddy marshes on the very margin of the open Gulf.

The nesting season of Marion's Marsh Wren extends from the middle of May well into July. It is not known whether more than one brood is raised.

Marian's Marsh Wren is so retiring in habit that it may be easily overlooked, especially in winter; but it is very confiding during the nesting season, the colony being readily located by the distinctive song of the male.

Marian's Marsh Wren, which presents so many interesting characteristics and problems, is confined to Alabama and Florida. It has never been reported from either Mississippi or Louisiana. It deserves protection throughout its range, especially from fires, which deprive it of indispensible shelter. While locally the birds are not rare, taken in all, the species must be considered as one of the rarest of the southern song birds.

The author acknowledges his obligations to many writers and correspondents mentioned in the text, and especially to Dr. R. M. Harper, of the Florida Geological Survey, for critical examination of the text, and to Mrs. Emily Willcoxson, assistant librarian of the Field Museum, for aid in searching the literature.

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1891. Ridgway, Robert. Cistothorus marianae, Buteo lineatus alleni, and Syrnium nebulosum alleni in South Carolina. *Auk*, Vol. 8, p. 240.

1892. Scott, W. E. D. Notes on the birds of the Caloosahatchee region of Florida. *Auk*, Vol. 9, pp. 209-218 (p. 214).

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[9]Since this was written Donald J. Nicholson reports finding a Worthington's Marsh Wren's nest on the east coast of Florida situated in a small mangrove bush.

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BIRMINGHAM, ALA.

THE AMERICAN EGRET AND THE LITTLE BLUE HERON IN OHIO DURING THE SUMMER OF 1930

BY LAWRENCE E. HICKS

Dr. J. M. Wheaton in his "Report on the Birds of Ohio", published in 1879, mentioned the American Egret (*Casmerodius albus egretta*) as a rather common visitor in July, August, and September, believing that the species might even breed in western Ohio. The Snowy Egret (*Egretta thula thula*) was listed as being very rare or accidental and the Little Blue Heron (*Florida caerulea*) was suspected of occurring, though never positively identified up to that time, probably being commonly confused with the Snowy Egret.

Mr. Julius F. Stone, of Columbus, reports having observed numerous "white herons" upon several occasions one summer in the late "eighties" at the Lewiston Reservoir (Indian Lake), in Logan County.

From about 1885 to 1905, the continued depredations of plume hunters in the heronries of southern United States, gradually reduced the numbers of our several species of herons until many were approaching the point of extinction. Of the three species mentioned above, probably the Little Blue Heron suffered the least, as neither the white nor the blue plumage of the species was ever in great demand. This reduction in numbers at the breeding grounds seems to have also greatly reduced the number of records obtained in our northern states during the post-nidification migrations and wanderings of late summer.

William Leon Dawson in his "Birds of Ohio", published in 1903, lists the Snowy Egret as a rare and irregular summer visitor, the American Egret as "formerly not an uncommon summer visitor, now very rare", and the Little Blue Heron as "formerly unknown, recently discovered to be not uncommon in late summer in the lower Scioto Valley and represented casually throughout the state". Henninger reported and collected Little Blue Herons in Pike County in August, 1901, and J. N. Proctor observed a number of the same species in Butler County in July, August, and September of the same year, collecting one specimen. Most of these birds were in the white plumage.

Lynds Jones in his "Revised Catalog of the Birds of Ohio", also published in 1903, lists the American Egret as rare in summer, mentioning records from several scattered northern Ohio counties, the Little Blue Heron as rather rare and irregular, and the Snowy Egret as rare and irregular, mentioning several records from scattered northern Ohio counties, many of which probably actually referred to Little Blue Herons.

A few scattered records of Little Blue Herons and American Egrets were reported from various sections of the state from 1905 to 1920, but both species during that period were regarded as rather rare and very irregular in occurrence.

Robert B. Gordon, in an article in "Short Papers on Ohio Birds", an Ohio State Museum publication of April, 1928, summarizes the

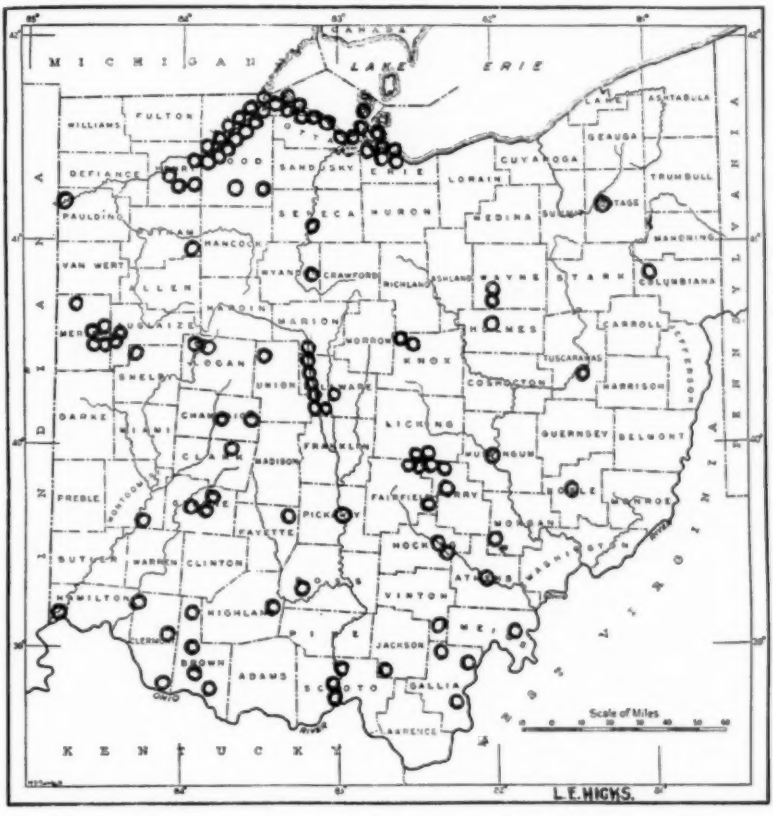

FIG. 52. The 1930 Records of the American Egret in Ohio.

Little Blue Heron and the American Egret records in Ohio for the preceding five years. In 1924, no less than 26 Little Blue Herons (19 reports) and 3 American Egrets (9 reports) were recorded. The year 1925 was dry with drouth conditions prevalent in many areas in eastern United States and 6 Little Blue Herons (6 reports) and 14 American Egrets (19 reports) were tabulated. In 1926 only one Little Blue Heron was reported, but American Egrets were seen in at least four widely separated localities.

No records were obtained in 1927 and only a few scattered reports, including both species, however, in 1928. Of more than 35 Little Blue Herons recorded during these years, all but 6 or 7 were in the white plumage. In 1929 both species were recorded again, including one American Egret observed by the writer in the extreme northeastern part of Ohio at Lake Cardinal in Ashtabula County on July 21, and a number of the same species observed by others at the O'Shaughnessy Reservoir in Delaware County and in the Toledo region.

Lewis W. Campbell in his check list of "The Birds of Toledo, Ohio, and Vicinity" (1930), lists both the American Egret and the Little Blue Heron as rare summer visitors.

During the past 1930 season, a combination of continued unusual conditions was apparently responsible for the influx of American Egrets and Little Blue Herons into the state in numbers far in excess of those that have ever occurred since the dawn of ornithological studies in our state.

The snowy Egret and the Yellow-crowned Night Heron occurred in at least one locality each, bringing the total number of the bittern and heron tribe represented in Ohio during the year 1930 to at least nine species.

During June, July, August, September, and October, the writer was fortunate enough to be able to spend the entire time afield, some field work being done in each one of the eighty-eight counties of the state. During that time, at least one person and in many cases five or more individuals were interviewed in each county concerning the occurrence of "white herons". In addition reports were received from each one of the eighty-one Ohio Division of Conservation game protectors of the state. About 180 questionaire letters were mailed to field workers of various types who might furnish records and an especial attempt was made to reach every Wilson Club member in the state.

Mr. Milton B. Trautman, of Columbus, was engaged in making some aquatic studies during these months, visiting nearly every county of the state, and especially those localities most likely to be frequented by these birds; to him I wish to express my sincere appreciation for the numerous records furnished. I wish to thank Robert H. McCormick, who assisted me in my own work during the summer; E. L. Moseley, of Bowling Green; Lewis W. Campbell, of Toledo; Jim A. Bruce, of Wooster; and many others, who in addition to furnishing records of their own, aided in the work by compiling records of other observers from their own localities. Without this combined coöperation of several hundred bird enthusiasts from all sections of the state,

the task of attempting to compile even a very incomplete record of heron occurrences would have been impossible.

The two distribution maps following indicate the localities of the state from which what seemed to be authentic records of either the Little Blue Heron or the American Egret were received. Many of the circles represent several groups of "white herons" reported from ad-

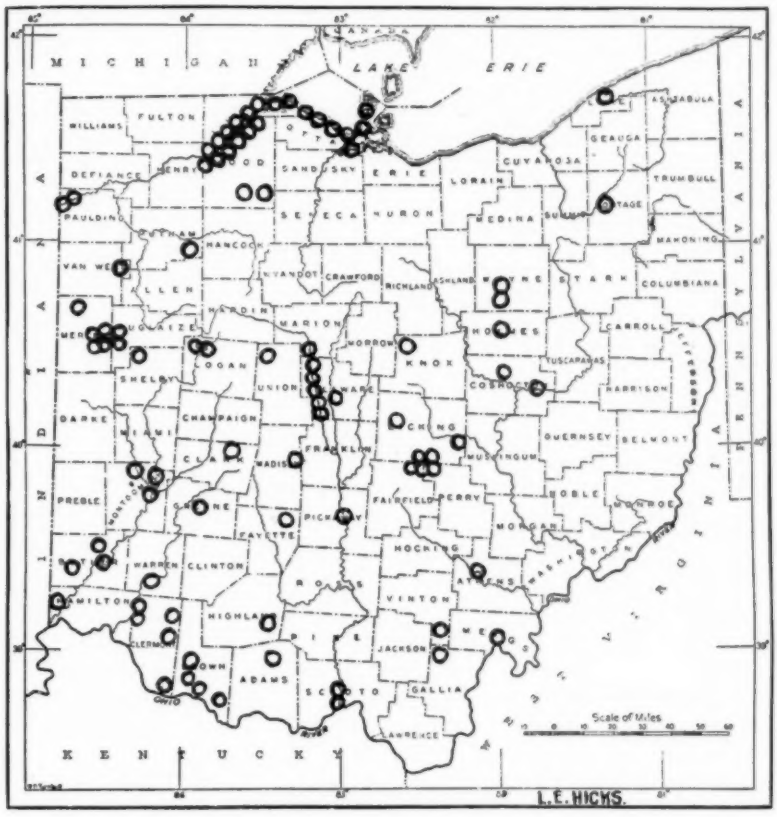

FIG. 53. The 1930 Records of the Little Blue Heron in Ohio.

jacent localities or groups of herons which were repeatedly observed for a period of from one to three months in a single locality.

The distribution maps are followed by a list of the records for each county, with locality, number of each species observed, date of observation, and the name of the observer or observers. Listing records by counties was found to be not entirely satisfactory, as several concentrations of these birds occurred near county line boundaries. It is also regrettable that it was not found possible to give a complete

list of all of the records received. In four instances, however, a number of records have been listed from a single locality to show the abundance and fluctuations in numbers of the two species as the summer progressed. These are the Buckeye Lake records in Licking, Fairfield, and Perry Counties, the Wayne County records in swampy areas south of Wooster, the Scioto River records in Delaware County, and the Maumee River records in Lucas and Wood Counties.

A survey of the records shows that the American Egrets were recorded in 45 of the 88 counties of the state, with about 110 localities represented. Little Blue Herons were recorded from at least 40 counties and about 95 localities. Not a single bird of this species in the blue adult plumage was reported. At least one of the two species was reported from 54 of our Ohio counties and a number of the localities reporting either Little Blue Herons or American Egrets or both, totals about 115. In all, however, more than 410 reports were received.

In addition to these species, an immature Snowy Egret (*Egretta candidissima*) was collected by Milton B. Trautman at Buckeye Lake on August 27, 1930. Twelve American Egrets and twenty Little Blue Herons were present at the lake on the same day. The specimen is now to be found at the Ohio State Museum in Columbus. Two Yellow-crowned Night Herons were positively identified by Mr. Trautman at Indian Lake in Logan County on September 1, 1930, and the presence of this species was suspected, though not positively established in several other localities of the state. The Snowy Egret also probably occurred elsewhere in the state, but in the immature plumage especially, would have been very difficult to single out from the numerous Little Blue Herons in white plumage.

The first American Egret record of the year was of two individuals observed by the writer at Venice on Lake Erie in Erie County on July 17. A railroad employee who had been working for some time along the edge of the marsh where the herons were feeding, told me that the birds had been present three days. The next records were Reno, Ottawa County, and Bono, Lucas County, on July 20; St. Marys, Mercer County, on July 24; Buckeye Lake, Licking County, and Wooster, Wayne County, on July 25; O'Shaughnessy Reservoir, Delaware County, and Upper Sandusky, Wyandot County, on July 27; and Napoleon, Henry County, Millersburg, Holmes County, and Fredericktown, Knox County, on July 28. This appearance of the species in numbers in so many widely separated localities within ten days of the first known occurrence, is rather significant.

The last American Egret reported for the season was a single bird at Buckeye Lake observed by M. B. Trautman on October 14. Another single bird was observed at the lake on October 6, and two individuals on the same date at O'Shaughnessy Reservoir, Delaware County. Other last dates were Toledo, Lucas County, September 20; New Moorfield, Clark County, September 24; and Wooster, Wayne County, September 1.

The species, then, is known to have been present in the state from July 17 to October 14, a total of ninety days; rather general from July 25 to September 20, reaching its height in numbers between August 8 and September 1.

The first Little Blue Heron record of the year was of two individuals observed by Robert H. McCormick and the writer at O'Shaughnessy Reservoir, Delaware County, on July 19. The next records were at Reno, Ottawa County, Bono, Lucas County, Englewood Dam, Montgomery County, and Ohio Brush Creek, Adams County, on July 20; Xenia, Greene County, on July 21; Tuscarawas River, Coshocton County, on July 23; Antwerp, Paulding County, Indian Creek, Butler County, and Wooster, Wayne County, on July 28. Here again, the species occurred in widely separated localities and in considerable numbers within ten days after its first known occurrence.

The last Little Blue Herons reported for 1930, were two individuals observed by Gus Stucker at New Moorfield, Clark County, on September 24. Other last dates were Buckeye Lake on September 23; Little Cedar Point Marsh, Lucas County, on August 24; and Olentangey River, Delaware County, on August 30. Previous extreme dates of the Little Blue Heron recorded in the Wheaton Club records of Columbus were July 24, 1926, and September 18, 1924; and of the American Egret, July 24, 1926, and September 24, 1924.

The Little Blue Heron, then, is known to have been present in the state from July 19, 1930, to September 24, 1930, a total of sixty-eight days; rather general from July 23 to September 10, reaching its height in numbers between July 27 and August 28. The Little Blue Heron made its appearance at practically the same time as the American Egret, but became numerous much more quickly, was common for about a month, and disappeared about three weeks before its larger relative.

The total number of individuals of each species included in the 410 reports received is, American Egret 755 and Little Blue Heron 1185. This would seem to indicate that in the state as a whole, three

	County	Location	American Egrets	Little Blue Herons	Date	Observed by
1.	Adams	Ohio Brush Creek	0	12	7-20-30	O. K. Loudenback, W. Union
2.	Athens	4 miles northwest Athens	1	1	9-10-30	J. C. Hambleton, Columbus
3.	Auglaize	St. Marys Res.	3	3	8-30-30	M. B. Trautman, Columbus
4.	Brown	White Oak Creek 2 mi. south Georgetown	1	12	8-14-30	J. R. Srofe, Georgetown
		Eagle Creek	0	2	8-18-30	J. R. Srofe, Georgetown
		Straight Creek	2	3	8-24-30	J. R. Srofe, Georgetown
		White Oak Creek	1	1	8-16-30	M. B. Trautman, Columbus
		Fayetteville	1	0	8-17-30	M. B. Trautman, Columbus
5.	Butler	Four Mile Creek	0	12	7-28-30	J. E. Beaver, Hamilton
		Miami R.—Hamilton	0	10	9- 4-30	J. E. Beaver, Hamilton
		Indian Creek	0	28	7-25 to 9-5	J. E. Beaver, Hamilton
6.	Champaign	Near Woodstock	4	0	8-17-30	C. W. Cushman, Woodstock
		1 mile east Urbana	1	0	8-15-30	Earl Zirkle, Urbana
8.	Clark	Buck Creek, near New Moorfield	1	1	9- 1-30	Gus Stucker, Springfield
			1	0	9- 2-30	Gus Stucker, Springfield
			2	1	9- 3-30	Gus Stucker, Springfield
			1	0	9- 6-30	Gus Stucker, Springfield
			2	4	9-24-30	Gus Stucker, Springfield
9.	Clermont	Little Miami R. at Milford	1	12	9- 3-30	Frank Stagg, Batavia
		Williamsburg	2	11	8-20-30	Frank Stagg, Batavia
		Bullskin Creek—Fr. T.	1	4	8-17-30	M. B. Trautman, Columbus
		River at Milford	0	3	8-17-30	M. B. Trautman, Columbus
		Jackson Township	0	2	8-17-30	M. B. Trautman, Columbus
10.	Columbiana	Beaver Lake	1	0	9- 7-30	Paul A. Stewart, Wooster
11.	Coshocton	Killbuck Creek, north of Coshocton	0	4	7-25 to 8-28	P. Johnson, Coshocton
		Tuscarawas River, east of Coshocton	0	4	7-23 to 8-26	P. Johnson, Coshocton

	County	*Location*	*American Egrets*	*Little Blue Herons*	*Date*	*Observed by*
12.	Delaware	O'Shaughnessy Res.	0	2	7-19-30	L. E. Hicks, Columbus
		Scioto R.—Radnor T.	2	6	8-25-30	O. H. Neimeyer, Prospect
		Rathbone—Scioto R.	4	0	9-17-30	L. E. Hicks, Columbus
		O'Shaughnessy Res.	3	0	9-26-30	R. McCormick, Columbus
		Warrensburg	2	3	8-10-30	M. B. Trautman, Columbus
		Rathbone—Scioto R.	3	0	9-15-30	M. B. Trautman, Columbus
		Olentangey River at Stratford	0	4	8-2 to 8-30	W. B. Hughes, Delaware
		O'Shaughnessy Res.	3	0	9-26-30	R. McCormick, Columbus
		Rathbone—Scioto R.	2	0	10- 6-30	R. McCormick, Columbus
		O'Shaughnessy Res.	1	0	7-27-30	M. B. Trautman, Columbus
13.	Erie	Venice on Lake Erie	2	0	7-17-30	L. E. Hicks, Columbus
		Sandusky	1	0	8-19-30	H. Crossley, Sandusky
		6 miles west Sandusky	4	0	9-16-30	Dr. H. Graefe, Sandusky
14.	Fairfield	Buckeye Lake	8	21	7-31-30	M. B. Trautman, E. Wickliffe
		Rush Creek—Rushville	12	12	7-20-30	C. F. Walker Columbus
15.	Fayette	Madison Township	4	7	8-17-30	M. B. Trautman, Columbus
16.	Gallia	Lower Raccoon Creek	3	0	8-12-30	J. Harrison, Gallipolis
		Lower Champaign Creek	4	0	8-14-30	J. Harrison, Gallipolis
		Ewington	0	2	8- 3-30	M. B. Trautman, Columbus
17.	Greene	Xenia Fish Hatchery	0	4	7-21-30	E. Harner, Xenia
		Xenia Fish Hatchery	1	17	8-24-30	E. Harner, Xenia
		Trebein—Little Miami River	1	0	9-14-30	E. S.-B. J. Blincoe, Dayton
		6 miles northeast Xenia	1	0	9-10-30	J. C. Hambleton, Columbus
18.	Hamilton	Lower Whitewater River	0	7	8- 1-30	D. M. Bowersox, Cincinnati
		Mouth Big Miami River	10	0	8-17-30	D. M. Bowersox, Cincinnati
19.	Henry	6 miles south Napoleon	1	0	7-28-30	A. Palmer, Jr., B. Green
		Richfield Township	1	0	8-31-30	M. B. Trautman, Columbus
		Lost Creek—Monroe Township	1	0	8-31-30	M. B. Trautman, Columbus
20.	Highland	Rocky Ford Creek	18	12	8- 3-30	Clyde L. Srofe, Hillsboro

	County	*Location*	*American Egrets*	*Little Blue Herons*	*Date*	*Observed by*
21.	Hocking	Hocking River, east of Logan	8	0	8-15-30	C. C. Higgans, Logan
		No. 2 Bridge—Hocking River	8	0	8-30-30	C. C. Higgans, Logan
22.	Holmes	4 miles north Millersburg	12	52	7-28 to 9-7-30	P. Johnson, Coshocton
23.	Jackson	Hamilton Township	1	0	8- 1-30	F. M. Cherrington, Jackson
24.	Knox	4 miles north Fredericktown	5	0	7-28-30	L. E. Hicks, Columbus
		Fredericktown	0	14	8-15-30	G. C. Doup, Mt. Vernon
		Fredericktown	12	0	8-30-30	G. C. Doup, Mt. Vernon
25.	Licking	Near Johnstown	0	10	8-14-30	Mrs. N. G. Buxton, Johnstown
		Buckeye Lake	1	0	10-6-30	E. L. Wickliffe, Columbus
		Tobosco	0	5	9-10-30	G. Wolfrom, Columbus
		Tobosco	0	50	7-28 to 9-5-30	Reported to G. Wolfrom, Col'm's
		Buckeye Lake	8	21	7-30-30	M. B. Trautman, Columbus
		Buckeye Lake	2	12	8- 7-30	M. B. Trautman, Columbus
		Buckeye Lake	17	11	9- 6-30	M. B. Trautman, Columbus
		Buckeye Lake	15	8	9- 9-30	M. B. Trautman, Columbus
		Buckeye Lake	20	2	9-10-30	M. B. Trautman, Columbus
		Buckeye Lake	20	5	9-17-30	M. B. Trautman, Columbus
		Buckeye Lake	11	2	9-23-30	M. B. Trautman, Columbus
		Buckeye Lake	1	0	10-14-30	M. B. Trautman, Columbus
26.	Lake	Grand River—Perry Township	0	1	8-12-30	E. A. Doolittle, Painesville
27.	Logan	Indian Lake	15	5	9- 1-30	M. B. Trautman, Columbus
28.	Lucas	1 mile east Bono	6	10	8- 1-30	L. E. Hicks, Columbus
		Near Bono	1	15	7-20-30	L. Campbell, Toledo
		Waterville	8	0	8- 4-30	Margaret Keler
		Grand Rapids	8	0	8- 5-30	Dr. Barr
		Grand Rapids	5	0	8- 6-30	E. L. Moseley, B. Green
		Maumee to Otsego R.	20	20	8- 9-30	L. W. Campbell, Toledo
		Maumee to Otsego R. (Additional terr.)	1	40	8- 9-30	E. L. Moseley, B. Green
		McGee Marshes	25	25	8-10-30	L. W. Campbell, Toledo
		Little Cedar Point	0	4	8-24-30	L. W. Campbell, Toledo

	County	*Location*	*American Egrets*	*Little Blue Herons*	*Date*	*Observed by*
		Maumee River, southwest Toledo	4	0	9-20-30	L. W. Campbell, Toledo
		Maumee River	0	45	8-23-30	L. W. Campbell, Toledo
		Maumee Bay	5	0	8-26-30	C. Meyers, Toledo
		Maumee River	3	0	9- 3-30	C. Meyers, Toledo
29.	Montgomery	Taylorsville Dam	0	6	7-23-30	L. E. Hicks, Columbus
		3 miles south Miamisburg	7	0	8-10-30	K. L. Keller, Dayton
		City Limits—Dayton	0	1	8-31-30	L. E. Hicks, Columbus
		Englewood Dam	0	6	7-19-30	B. J. Blincoe, Dayton
		Englewood Dam	0	4	7-20-30	E. S. Blincoe, Dayton
		Englewood Dam	0	2	7-21-30	M. B. Trautman, Columbus
30.	Madison	6 miles north W. Jefferson	0	2	8-11-30	J. H. Umbenhaur, London
31.	Marion	Scioto River—Prospect	4	8	8-20-30	O. H. Neimeyer, Prospect
32.	Meigs	Shade River—Pomeroy	2	0	8-16-30	H. L. Roush, H. H. Thomas
		Forest River Mine—Pomeroy	0	2	8-10-30	Reported to H. H. Thomas
33.	Mercer	St. Marys Res.	1	0	7-24-30	W. J. Heathe, Van Wert
		St. Marys Res.	15	10	8-30-30	M. B. Trautman, Columbus
		St. Marys River—Rockford	1	1	9- 1-30	M. B. Trautman, Columbus
34.	Morgon	Sunday Creek, north Glouster	1	0	8- 9-30	B. LaFever, Glouster
35.	Muskingum	At Zanesville	4	0	8- 6-30	B. LaFever, Glouster
36.	Noble	Near Caldwell	1	0	8-22-30	D. A. Woodford, Caldwell
37.	Ottawa	Near Reno—Lake Erie	10	14	8- 1-30	L. E. Hicks, Columbus
		2 miles south Pt. Clinton	1	0	8-18-30	R. W. Sutter
		Catawba Island	0	4	8- 8-30	R. Conant
		Reno	1	15	7-20-30	L. W. Campbell, Toledo
		Northwest Pt. Clinton	20	2	8-15-30	B. Lance, Pt. Clinton
		Put-In-Bay	10	3	9- 3-30	M. B. Trautman, Columbus
		Put-In-Bay	2	2	9- 4-30	M. B. Trautman, Columbus
		Put-In-Bay	5	3	9- 5-30	M. B. Trautman, Columbus

	County	*Location*	*American Egrets*	*Litle Blue Herons*	*Date*	*Observed by*
38.	Pickaway	Circleville	3	6	8-17-30	F. Bartley, L. Pontius
39.	Paulding	Maumee River—Antwerp	0	2	7-25-30	L. E. Hicks, Columbus
		Maumee River—Indiana Line	5	2	8-31-30	M. B. Trautman, Columbus
40.	Perry	Near Somerset	2	0	8- 1-30	L. A. Paxton, N. Lexington
		Jonathan Creek	1	0	8- 4-30	L. A. Paxton, N. Lexington
		Buckeye Lake	8	21	7-31-30	L. E. Hicks, Columbus
		Buckeye Lake	14	77	8- 9-30	M. B. Trautman, Columbus
		Buckeye Lake	1	5	8-20-30	M. B. Trautman, Columbus
		Buckeye Lake	5	10	8-23-30	M. B. Trautman, Columbus
		Buckeye Lake	12	35	8-24-30	M. B. Trautman, Columbus
		Buckeye Lake	3	10	8-26-30	M. B. Trautman, Columbus
		Buckeye Lake	12	20	8-27-30	M. B. Trautman, Columbus
41.	Portage	Wingfoot Lake	55	45	8-30-30	C. I. Long, Akron
42.	Putnam	Riley Creek, north Bluffton	2	3	8-8 to 8-20	R. W. Sutter
43.	Ross	2 miles north Bainbridge	3	0	8-17-30	F. Bartley, L. Pontius
44.	Scioto	Scioto River—Portsmouth	10	17	8-12-30	C. Roth, Portsmouth
		North of Lucasville	2	0	8- 6-30	C. Walker, E. S. Thomas
45.	Seneca	Sandusky River	20	0	7-30-30	L. W. Paste, Galion
46.	Shelby	Lake Loramie	4	12	9- 1-30	E. S.-B. J. Blincoe, Dayton
47.	Tuscarawas	Tuscarawas River, near Gnadenhutten	4	0	8-16-30	C. F. Walker, Columbus
48.	Union	Bokes Creek—York Township	1	1	9- 1-30	M. B. Trautman, Columbus
49.	Van Wert	Washington Township	0	1	8-31-30	M. B. Trautman, Columbus
50.	Vinton	Clarion	1	2	8- 3-30	M. B. Trautman, Columbus
51.	Warren	4 miles north Morrow	0	2	8-12-30	K. L. Keller, Dayton

	County	*Location*	*American Egrets*	*Little Blue Herons*	*Date*	*Observed by*
52.	Wayne	6 miles southwest Wooster	11	0	8-17-30	P. Stewart, J. Bruce
		6 miles southwest Wooster	15	6	7-25-30	J. Bruce, Wooster
		6 miles southwest Wooster	15	20	8- 2-30	R. Baird, J. Bruce
		6 miles southwest Wooster	25	10	8-12-30	N. Wylie, J. Bruce
		6 miles southwest Wooster	15	2	8-14-30	H. Palmer, J. Bruce
		6 miles southwest Wooster	11	0	8-19-30	A. Kaehler, J. Bruce
		6 miles southwest Wooster	5	0	9- 1-30	G. H. Crawl, Wooster
		2 miles south Wooster	15	0	8-15-30	W. E. Winkler, Wooster
53.	Wood	Maumee River—Grand River	0	28	8- 4-30	A. D. Meagley, Haskins
		Maumee River—Waterville	18	23	8-18-30	A. D. Meagley, Haskins
		Otsego, Maumee River	1	0	8-31-30	G. Graham
		Grand Rapids	1	0	8-24-30	Mrs. A. Jenkins
		Otsego, Maumee River	4	0	8-11-30	G. Grames
		Otsego, Maumee River	1	15	8-13-30	E. L. Moseley, B. Green
		Montgomery Township	1	2	8-30-30	M. B. Trautman, Columbus
		Jerry City	2	0	8-30-30	M. B. Trautman, Columbus
		Maumee Rapids	4	3	8-30-30	M. B. Trautman, Columbus
		Otsego	0	1	7-28-30	G. Grames
		Otsego	0	47	8- 9-30	E. L. Moseley, B. Green
		Otsego	0	50	8-12-30	A. Daniels
		Waterville	0	15	8-14-30	R. Conant
		Otsego	0	15	8- 6-30	W. Daniels
		Grand Rapids	4	0	8-31-30	E. L. Moseley, B. Green
		Otsego	2	12	8-19-30	G. Grames
54.	Wyandot	5 miles east U. Sandusky	1	0	7-27-30	M. B. Trautman, Columbus

American Egrets were present for every five Little Blue Herons. Of course, many of these birds were perhaps counted two or more times in the same locality or counted by different observers as they moved from one locality to another. In making estimates of the total number of any species present, we have no way of making allowances for repeated counts.

On the other hand, it seems certain that usually only a part of the individuals present in any locality on a certain day could be enumerated by observers, however well planned an attempt may have been to take a complete count in a given area. Also, in spite of the combined efforts of several hundred observers, the localities listed undoubtedly represent a minority percentage of the total number of localities in which the species did occur, although unusual drouth conditions did surprisingly limit the possible situations where birds might be found, and tend to concentrate our "white heron" population on a relatively small number of isolated tracts. The conspicuousness of the birds in question and the excitement and interest which their appearance always aroused, did materially aid in bringing occurrences to the attention of parties interested in reporting records.

Any attempt to estimate the total number of individuals of each species which spent some portion of the summer of 1930 within the state of Ohio, would be a rather wild speculation in spite of considerable data on the basis of which such an estimate might be made. Any estimate, however, can hardly be proven erroneous, so one might be pardoned for venturing that perhaps 3,000 American Egrets and 5,000 Little Blue Herons did occur at some time during the summer of 1930 in the Buckeye State. The combined number of both species certainly must have exceeded 3,000 individuals and could hardly have been in excess of 15,000.

This estimate is considerably lower than that made for Indiana by Mr. Sidney R. Esten, field worker on birds for the Indiana Department of Conservation. Indiana has a considerably greater number of habitats attractive to summering "white herons" than Ohio, and numerous letters were received from many localities of that state reporting herons in flocks of 50 to 600. Mr. Esten believes that the total number of both species in Indiana in 1930 must have been considerably in excess of 25,000.

A glance at the distribution maps shows that about three-fourths of all records received were from the western half of Ohio. Concentrations occurred at all of the larger reservoirs of the state, at the western end of Lake Erie, and along the Scioto and Miami River Val-

leys. Many of the smaller tributaries of the Ohio River in the southwestern part of the state were attractive to herons. Both species were scarcely reported from the eastern, rough, Appalachian third of the state except in the valleys of some of the larger streams such as those of the Hocking, Muskingum, and Tuscarawas Rivers.

During the months of July, August, and September, the water table in most sections was undoubtedly lower than it had ever been since the coming of the first white man to Ohio. Hundreds of small lakes, ponds, swamps, marshes, and fairly large streams, became completely dry early in the summer. This fact was important in concentrating the heron population about the few remaining bodies of stagnant water and along the larger streams and rivers, making their numbers more conspicuous than ever before.

Similar conditions prevailing in most of the normal late summer range of most of these birds in southern United States, induced them, after the nesting season, to travel farther northward in greater numbers than ever before. Another factor undoubtedly important in explaining their recent abundance, is that there has recently been a rapid increase in the total population of these species in the gulf states, in part at least, due to increased protection at the breeding grounds. Another factor, perhaps still more important, was the abundance of food made readily available to herons by the retreating waters of pond and stream as the unusual drouth progressed, making it possible for large numbers of birds to concentrate in a restricted locality for a considerable time. It will be of extreme interest to make a further study of the occurrence of these birds during the coming year and to record whether any considerable number return to those localities first visited during the summer of 1930.

Ohio Division of Conservation,
Columbus, Ohio.

THE EFFECT OF POLE TRAPS ON HARMLESS AND BENEFICIAL SPECIES*

BY H. M. WIGHT

An investigation of Michigan's privately owned State game refuge system was made by the writer in 1928, as a coöperative project between the School of Forestry and Conservation, University of Michigan, and the State Department of Conservation.

This investigation considered among many other factors the different types of management that were in use upon the 118 refuges studied. It was found that the opinion prevailed that the most important factor in management was the control of predatory animals. One of the common methods of destroying hawks and owls is by means of the pole trap, and although such traps were not in excessive use at the time, they appeared to be increasing in popularity. Those who were practicing this type of control apparently had given but little thought to the possibility that beneficial or innocent species might be trapped accidentally and, as far as could be ascertained, no reliable information on this question was available in the state. Data concerning this and other information pertaining to pole traps were collected by means of direct experimentation and by distributing questionnaires among users of pole traps. On these questionnaires the trappers were asked to record information from which the ratio of the injurious animals to the beneficial or innocent species taken could be determined. Unfortunately this latter method yielded but little information. One man who had used pole traps for several years, discarded them after keeping trapping records for a few days, for song birds and squirrels were the only animals taken. Obviously because of previous failure to keep records he had not realized the preponderance of beneficial or neutral forms of life that were trapped. Most of the others apparently either failed to keep the records or neglected to send in their results and little definite information was obtained from the questionnaires. An actual test made in the field under personal supervision, however, yielded better results.

This test was made between the 10th and 23rd of April, 1928, a period of the year that appeared to be well suited to a test of this sort. While the period covered was so short that the results cannot

*Contribution No. 16 from the School of Forestry and Conservation, University of Michigan.

be regarded as conclusive, they are nevertheless suggestive and are unquestionably reliable so far as they go. The data obtained are therefore presented for the information of those interested and in the hope that they may stimulate some pole trappers to keep records that will serve as a basis for drawing generally applicable conclusions.

A section of land was chosen which included diversified agricultural area, an excellent tamarack bog and swamp, three sedge and wild grass marshes, and six woodlots well stocked with old growth hardwood timber. A good sized spruce and tamarack swamp and several lakes were situated in the immediate vicinity. A reconnaissance of the area clearly showed it to be typical of the better class of Michigan's privately owned state game refuges and demonstrated its suitability for the trapping experiment. The woodlots provided nesting sites for numerous crows and hawks and the location of one red-shoulder's nest and several crows' nests was determined. Both the swamp and the sedge-grass marshes harbored an abundance of mice and provided cover for both pheasants and quail. Ruffed Grouse found food and shelter in the tamarack swamp and the adjoining hardwoods. The area was constantly hunted by Marsh Hawks, a pair of which was known to nest in one of the sedge-grass marshes. Three old strawstacks and three isolated storage barns provided shelter and food for a heavy mouse population. In short, conditions were ideal for hawks and owls.

That these birds were present was proved by a preliminary survey which showed the following species of predatory birds to be within or in the immediate vicinity of the area: The Red-shouldered Hawk, Sharp-shinned Hawk, Marsh Hawk, Broad-winged Hawk, Cooper's Hawk, Red-tailed Hawk, and the Barred Owl, while there were reliable reports of Great Horned Owls and numerous Screech Owls in the nearby timber, and several of the latter were trapped.

The experiment was outlined to obtain definite information on the ratio of the various species captured in pole traps and to determine the effect on efficiency of the size of trap, the length and diameter of the pole, the nature of the sets, and the bait used.

Four dozen jump traps, including numbers 0, 1, and 2, were used in seventeen different batteries with from one to five traps set in a cluster. The site of each set was definitely chosen for specific reasons. For instance, the location of Set No. 1 was chosen for its slightly ele-

vated position, the cover provided by a few trees, its proximity to a marsh, a heavy population of *Microtus* and cottontails, an abundance of blackbirds, and also because other birds were observed to be common here. As Sharp-shinned Hawks had been observed in this locality, this set was made especially with the hope of catching these birds. This cluster of traps yielded Robins, blackbirds, and Red-shouldered Hawks instead of the Sharp-shinned Hawks which were expected.

Set No. VI was located close to the carcasses of a horse and a sheep, which were being eaten by Turkey Vultures and Crows. This set yielded a Crow, a Red-shouldered Hawk, a Sharp-shinned Hawk and a Robin. That there frequently occurred a general relationship between the choice of the locality for expected species and those caught, is demonstrated by Set No. VII which consisted of a battery of three traps placed within the marsh and along its margins, where both pheasant and quail were common. An examination of the margins of this marsh demonstrated a concentrated mouse population. The catch here consisted of a Marsh Hawk, two Screech Owls, and a Meadowlark. Meadowlarks and Marsh Hawks have been observed repeatedly in this vicinity and the concentrated mouse population here provided excellent feeding grounds for the owls and the hawks.

The traps were placed on top of the poles by means of small blocks of wood provided with headless nails. When a trap closed it readily became loosened from the block and fell off, leaving the animal suspended by the trap chain in some instances, while in others the chain was looped about the pole allowing the traps to slide to the ground. Poles from three to twenty feet in length were used. These varied from two inches to six inches in diameter.

Some sets were not baited; others, as already mentioned, were baited by carcasses of animals, while living White Leghorn roosters were used as decoys in the majority of cases. One set used a live Barred Owl as a decoy. This set successfully decoyed and caught the second Barred Owl during the first night. The roosters were either retained in cages with wire or slat tops, or were tethered out by the leg, while one was turned loose and was successfully kept near the traps by daily feeding and watering at the base of the poles. The traps were visited early each morning and were observed frequently throughout the day, to alleviate unnecessary suffering.

Forty-eight pole traps were kept in constant operation from six to thirteen days with a total of 548 pole trap days. Twenty-nine animals were trapped during the period or approximately one catch per nineteen trap days. The animals taken consisted of the following:

Hawks		
Red Shouldered Hawk	6	
Marsh Hawk	1	
Broad-winged Hawk	1	
Sharp-shinned Hawk	1	
Total		9
Owls		
Screech Owl	3	
Barred Owl	4	
Total		7
Crow	1	1
Song Birds		
Robin	2	
Blackbird	2	
Meadowlark	2	
Vesper Sparrow	2	
Hermit Thrush	1	
Song Sparrow	1	
Total		10
Mammals		
Fox Squirrel	2	2
Grand Total		29

A stomach examination of each owl, hawk, and crow gave the following results:

PREDATORY BIRDS POLE TRAPPED BETWEEN APRIL 11 AND APRIL 23, 1928, ON OR NEAR MASON FARM, WASHTENAW COUNTY, NORTHFIELD AND WEBSTER TOWNSHIPS

Site No.	*Trap No.*	*Species*	*Stomach Content*
I	1	Red-shouldered Hawk	1 field mouse
I	2	Red-shouldered Hawk	1 field mouse
I	4	Red-shouldered Hawk	1 shrew and 2 field mice
IV	3	Red-shouldered Hawk	Few feathers, mouse hair, parts of beetle, and vegetation
VI	3	Red-shouldered Hawk	1 field mouse
XVI	3	Red-shouldered Hawk	Trace of mouse hair
VI	4	Sharp-shinned Hawk	Feathers—small seed eating bird. (Seeds obtained)
VII	4	Marsh Hawk	3 field mice
II	1	Barred Owl	Stomach empty (owl kept as decoy)
II	1	Barred Owl	Stomach empty (owl kept as decoy)
V	2	Barred Owl	Stomach empty
VIII	1	Barred Owl	Stomach empty
VII	3	Screech Owl	2 white-footed mice
VII	3	Screech Owl	Mouse hair and feathers
XVI	3	Screech Owl	Mouse hair and parts of a beetle
VI	1	Crow	Pieces of tissue, presumably from dead horse nearby

An examination of the legal status of the twenty-nine animals listed reveals that ten, or nearly 34.5 per cent, were protected by the State laws of Michigan, and that twenty-seven, or over 93 per cent, are protected by the laws of several other states.

The examination of the stomach content demonstrated that only three of the predators trapped had fed upon birds and two of these had also fed upon mice. Obviously the amount of data collected in the course of this experiment was not sufficient to serve as a basis for the economic classification of the species caught, therefore Fisher's classification of the economic status of predatory birds as given in "Hawks and Owls of the United States in Their Relation to Agriculture" has been adopted as a basis for classifying the birds captured into harmful and beneficial groups. Fisher's classification is based upon the most complete investigation of the subject produced to date. Upon this basis 93.75 per cent of the predatory birds taken in this in-

vestigation between April 11 and April 23, 1928, are chiefly beneficial, and only 6.25 per cent are positively harmful. In addition to these predatory birds, ten song birds, one Crow and two fox squirrels were taken.

It was thought that by the use of large traps the number of song birds taken would be decreased. This did not, however, prove to be the case.

The trap size, the number of each set and the catch for each type is as follows:

Size	*Number Set*	*Large Birds*	*Small Birds*	*Squirrels*
No. 0	14	4	3	1
No. 1	17	3	1	0
No. 2	17	8	8	1

From this it appears that larger traps may take a higher percentage of both large and small birds. A selective tendency on the part of the birds may possibly be expected on the basis of sight.

The forty-eight traps set at varying heights gave the following results:

	Height 0-6′	Catch per Trap Day	Height 7-10′	Catch per Trap Day	Height 11-20′	Catch per Trap Day	Total	Catch per Trap Day
No. of traps	26		10		12		48	
Trap days	302		115		131		548	
Large birds taken	7	.023	2	.017	4	.03	13	.023
Small birds taken	7	.023	4	.034	3	.022	14	.025
Mammals taken	2	.006	0	.0	0	.0	2	.003
Total for class	16	.052	6	.052	7	.053	29	.052

The height of the poles did not prove to be an important factor in the determination of either the number or species taken, except that both of the squirrels were taken on short poles. Neither did the diameter of the pole appear to have any differential effect upon the number or species taken.

If the average pole trap catches as large a proportion of harmless or beneficial birds as were captured in this experiment, its use should either be safeguarded or discontinued. One other method of reducing the objectionable slaughter of innocent birds by pole traps has been suggested; namely, the use of a trap that cannot be set off by a light bird. Any trap can be equipped to provide this safeguard. But even so the problem is by no means solved, for the Sharp-shinned Hawk, one of the most injurious species, might be given the same protection by such devices as is provided the larger song birds, while the beneficial and more readily trapped larger species will be taken together with the Cooper's Hawk, Goshawk, and the Great Horned Owl.

Field Data Table

Site No.	Trap No.	Days in Operation	Trap Size	Bait	Pole		Species Taken	How Caught	Date
					Diameter at Top	Height			
I	1	13	2	White rooster in crate—slat top	3 in.	14 ft.	R. S. Hawk Robin Blackbird	Both legs broken Both legs broken One foot	4-11 P. M. 4-11 A. M. 4-18 P. M.
	2	13	1	White rooster in crate—slat top	4 in.	6 ft.	R. S. Hawk	High on leg	4-17 A. M.
	3	13	2	White rooster in crate—slat top	4 in.	8 ft.			
	4	13	0	White rooster in crate—slat top	5 in.	4 ft.	R. S. Hawk	One toe	4-17 A. M.
II	1	13	2	White rooster in crate—wire top	3 in.	15 ft.	Barred Owl Barred Owl	Toes of one foot Both legs	4-11 A. M. 4-17 A. M.
	2	13	2	White rooster in crate—wire top	3 in.	8 ft.			
	3	13	1	White rooster in crate—wire top	4 in.	5 ft.			
III	1	13	2	White rooster tethered out	2 in.	6 ft.	Vesper Sparrow		4-11 A. M.
	2	13	1	White rooster tethered out	2 in.	12 ft.			
IV	1	13	2	White rooster in crate—wire top	4 in.	5 ft.			
	2	13	2	White rooster in crate—wire top	4 in.	5 ft.	Thrush	Caught high on both legs	4-23 A. M.
	3	13	2	White rooster in crate—wire top	4 in.	5 ft.	R. S. Hawk Fox Squirrel	One leg broken One leg broken	4-17 A. M. 4-20 A. M.
V	1	12	0	Barred owl tethered out	5 in.	4 ft.			

FIELD DATA TABLE—*Continued*

Site No.	Trap No.	Days in Operation	Trap Size	Bait	Pole		Species Taken	How Caught	Date
					Diameter at Top	Height			
	2	12	2	Barred owl tethered out	2 in.	13 ft.	Barred Owl	One leg, high up	4-13 A. M.
	3	10	0	Barred owl tethered out	2 in.	12 ft.			
	4	10	2	Barred owl tethered out	5 in.	4 ft.			
	5	10	1	Barred owl tethered out	3 in.	10 ft.			
VI	1	12	0	Carcasses of horse and sheep	4 in.	5 ft.	Crow Robin	One toe uninjured Both legs broken	4-18 P. M. 4-20 A. M.
	2	12	1	Carcasses of horse and sheep	4 in.	5 ft.			
	3	12	1	Carcasses of horse and sheep	4 in.	5 ft.	R. S. Hawk	Two toes	4-15 A. M.
	4	12	1	Carcasses of horse and sheep	4 in.	5 ft.	S. S. Hawk	Both legs above feet	4-23 A. M.
VII	1	11	1	White rooster in crate—wire top	2 in.	18 ft.			
	2	11	1	White rooster in crate—wire top	3 in.	10 ft.			
	3	11	2	White rooster in crate—wire top	5 in.	4 ft.	Screech Owl Screech Owl	Both legs Both legs	4-14 A. M. 4-17 A. M.
	4	11	0	White rooster in crate—wire top	6 in.	6 ft.	Meadowlark Marsh Hawk	Two toes One leg above foot	4-20 A. M. 4-23 A. M.
VIII	1	12	2	White rooster in crate—wire top	4 in.	9 ft.	Barred Owl	With legs above feet	4-23 A. M.
	2	12	0	White rooster in crate—wire top	8 in.	3 ft.	Fox Squirrel	Front foot	4-23 A. M.

FIELD DATA TABLE—*Continued*

Site No.	Trap No.	Days in Operation	Trap Size	Bait	Pole		Species Taken	How Caught	Date
					Diameter at Top	Height			
IX	1	12	0	White rooster in crate—slat top	2 in.	9 ft.	Blackbird Song Sparrow	One leg One leg	4-17 A. M. 4-23 P. M.
	2	12	0	White rooster in crate—slat top	3 in.	4 ft.			
X	1	9	1	White rooster in crate—wire top	3 in.	20 ft.			
	2	9	2	White rooster in crate—wire top	4 in.	5 ft.			
	3	9	2	White rooster in crate—wire top	4 in.	5 ft.			
XI	1	12	1	White rooster in crate—wire top	3 in.	12 ft.			
	2	12	1	White rooster in crate—wire top	5 in.	5 ft.			
	3	12	0	White rooster in crate—wire top	5 in.	5 ft.			
XII	1	11	2	White rooster loose	3 in.	15 ft.			
	2	11	1	White rooster loose	2 in.	10 ft.	Vesper Sparrow	One foot	4-12 P. M.
	3	11	0	White rooster loose	2 in.	10 ft.			
XIII	1	11	1	White rooster tethered out	4 in.	5 ft.	Broad-wing Hawk	Escaped with trap, identified in air by assistant	4-12 P. M.
	2	11	0	White rooster tethered out	4 in.	5 ft.			

FIELD DATA TABLE—*Continued*

Site No.	Trap No.	Days in Operation	Trap Size	Bait	Pole		Species Taken	How Caught	Date
					Diameter at Top	Height			
	3	11	1	White rooster tethered out	4 in.	5 ft.			
	4	11	0	White rooster tethered out	4 in.	5 ft.			
XIV	1	9	0	No bait	5 in.	4 ft.			
XV	1	10	2	No bait	3 in.	15 ft.			
XVI	1	11	1	White rooster tethered out	3 in.	12 ft.			
	2	11	0	White rooster tethered out	4 in.	8 ft.			
	3	11	2	White rooster tethered out	4 in.	8 ft.	R. S. Hawk Screech Owl	One leg broken Both legs broken	4-13 A. M. 4-18 A. M.
XVII	1	6	2	No bait	3 in.	14 ft.	Meadowlark		4-13-28

Thus it appears that even the traps that are equipped especially to take only the heavier birds cannot be safely set if the majority of the larger hawks and owls are to be generally conserved, as is very definitely demonstrated by competent authorities to be advisable in most instances.

As a result of this experiment, it appears that under conditions existing at the time a larger preponderance of harmless or beneficial birds were captured. The number of harmful species captured was so small as to be insignificant in so far as the protection of game on natural areas is concerned. The height at which the trap was set and the diameter of the pole had no significant effect upon the proportion of harmful and beneficial species taken. It is true that the experiment covered a relatively short period of time, and there is of course a possibility that results at another season might be more favorable for the pole trap, but there is no evidence, either published or within our experience to indicate that such would be the case.

Therefore, until further evidence is available it seems wise to limit carefully the use of pole traps to those areas where game is concentrated in unnaturally large numbers, such as at game farms, or where it can be definitely established that damage of a serious nature is being done by species which can best be controlled by these devices. Our observations indicate that on the majority of the privately owned game refuges investigated in Michigan, the damage done by predatory birds is too small to justify the sacrifice of innocent birds and mammals that pole trapping evidently entails.

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WINTER FOOD OF OKLAHOMA QUAIL*

BY LOIS GOULD BIRD AND R. D. BIRD

This study is based upon an examination of the crops of 138 quail taken in nineteen counties of Oklahoma. Of these, 135 were taken in December, 1929, during the latter part of the quail season and were sent to us by the state game rangers in response to a request made to Mr. Marsh B. Woodruff, then Assistant Game Warden. Three crops were taken in November by R. D. Bird. With the exception of four crops from Arizona Scaled Quail (*Callipepla squamata pallida*) from Cimmarron County, they were all from Bob-white (*Colinus virginianus virginianus*).

The study of the winter food of birds is important because winter is the critical time of food gathering. It is then that food is scarcest.

Food taken from bird crops is easily studied, for the contents have not been subjected to the process of digestion and are not affected by chemical action. The crop is a membranous, sac-like region of the oesophagus, easily distensible, which is used for the reception of food. Its capacity is from four to six times that of the gizzard. (2, p. 28). Seeds and insects in the crop, although in some cases broken and dirty, are in practically the same condition as when lying on the ground.

Previous Work

Dr. Sylvester D. Judd, of the United States Biological Survey, who has made extensive studies of the food of the Bob-white, states: "The Bob-white is probably the most useful abundant species on the farm. It is one of the most nearly omnivorous birds, consuming large quantities of weed seeds, and destroying many of the worst insect pests with which the farmer has to contend. It does not injure grain, fruit, or any other crop." (1, p. 194).

The food habits of the Bob-white have been studied by the Biological Survey both in the laboratory and in the field. On the basis of 918 stomachs from twenty-one states, Canada, the District of Columbia, and Mexico, collected in every month of the year, the food, calculated by volume, was: seeds, chiefly weeds, 52.83 per cent; grain 17.38 per cent; fruit 9.57 per cent; miscellaneous vegetable matter 3.81 per cent; animal matter, mainly insects, 16.41 per cent. (2, p. 27).

The character of the food varies with the season. It is chiefly vegetable matter from October to March and largely insects during the late spring and summer. (2, p. 28).

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*Contribution from the Zoological Laboratory of the University of Oklahoma, Second Series, No. 106.

Leguminous seeds form 15.52 per cent of the yearly food. Of this all but a small fraction comes from wild plants which are classed as weeds. In December legume seeds are eaten to the largest extent, when they form 25 per cent of the food. (2, p. 28).

The Bob-white is a notable exception to the fact that grain-eating birds are likely to do much harm to crops. The grain taken by Bob-whites is gleaned from stubble fields after harvest. This gleaning of waste grain is a beneficial habit, for volunteer grain is undesirable, especially where insect pests or parasitic fungi are to be combated. (2, pp. 29-30).

Among the insects eaten by the Bob-white are included many pests, some of which are the potato beetle, twelve-spotted cucumber beetle, striped cucumber beetle, various cutworms, army worm, cotton bollworm, cotton boll weevil, may beetle, red-legged grasshopper, Rocky Mountain locust, and chinch bug. The foraging habits of the Bob-white which extend to the center of the cultivated fields are of much benefit to the farmer. (2).

The amount and variety of food eaten by the Bob-white has been studied by Mrs. Nice (4), who says that "the Bob-white is known to eat 129 different kinds of weed seeds". "They eat 15 grams, or half an ounce, of weed seed daily throughout the winter" "and from 12 to 24 grams of insects daily in the summer". An estimate of the average amount eaten by a single Bob-white in a year is about five pounds of insects and nine and three-quarters pounds of weed seeds, equivalent to over sixty-five thousand insects and more than five million weed seeds. (4, p. 312).

Recent studies have been made of the food of quail by Stoddard (7) and Tate (8). In the study of 120 Bob-white stomachs taken in Georgia in December, 1924, Mr. Stoddard reports that pine mast made up 41 per cent of the food by bulk, legume seeds 31 per cent, sweet gum 4 per cent, ragweed 3 per cent, corn 3.5 per cent, and grasshoppers 5 per cent. (6, p. 16).

Mr. Tate, observing in the Panhandle of Oklahoma, reports as the favorite foods of the two quail within the state:

Bob-white: Grasshoppers, flies, crickets, aphids, burdock, pigweed, lamb's quarter, and Russian thistle seeds, milo maize, kaffir, and millet.

Arizona Scaled Quail: Grasshoppers, flies, ants, beetles, sunflower seeds, Russian thistle and lamb's quarter seed, milo maize, and kaffir.

Mr. Tate's observations were made as a result of examination of crop contents, field observations and feeding table records. (8, p. 33).

Ortenburger and Little (6) give the stomach contents of two Bob-whites from Harmon County and one Arizona Scaled Quail from Cimarron County.

As far as we now know, no other studies have been made of the food of Oklahoma quail.

Distribution of Crops

The crops were well distributed over the state. (See map, fig. 54). The counties represented were:

Panhandle: Cimarron, Texas, Beaver.

Northwest: Harper.

Southwest: Beckham, Jackson, Comanche.

Fig. 54. A map of Oklahoma showing counties and distribution of crops. The numbers refer to the numbers of crops taken. They were all of Bob-white, except the four so marked in Cimarron County of Arizona Scaled Quail.

Central: Noble, Oklahoma, Cleveland.

Northeast: Osage, Washington, Nowata, Rogers, Craig.

Southeast: Choctaw, Pittsburg, Latimer, LeFlore.

This was a sufficiently uniform distribution, represented by an ample number of crops, to give a good representation of the food of the quail throughout the state during December.

Procedure

The crops were taken from the birds, wrapped in paper and sent to us. They were opened, sorted and the contents placed in glass vials or gelatin capsules. The capsules proved most satisfactory for keeping separate small quantities of seeds, since they could be written upon and were transparent and inexpensive.

After the seeds were sorted, samples of undetermined species were sent to Mr. W. L. McAtee, of the United States Biological Survey, for

identification. From these identified samples, the others were named.

Insect identifications were made by R. D. Bird. Because of the fragmentary and broken condition, some of these could be placed only to the order. Others in better condition could be placed to the species.

Identification completed, the percentages of different kinds of seeds in each crop were estimated. Following the advice of Mr. McAtee, the percentage by bulk method was used rather than the numerical method. (3) The crop percentages were combined into county averages and from these the state average was computed. These averages are shown in the accompanying table (Table I) and graph (fig. 55).

Discussion

Food of the Bob-white

The examination showed that the proportions of the total state food of the Bob-white was:

Weed seeds*	50.8 per cent
Grain	35.1 per cent
Tree and shrub seeds	11.9 per cent
Insects and snails	1.5 per cent
Miscellaneous vegetable matter	.7 per cent

Plant Food

Vegetable matter made up 98.5 per cent of the food. Half of this consisted of weed seeds, chiefly from common and bothersome weeds, such as ragweed, sunflower, smartweed, pigweed, beggar-ticks, tick trefoil, and thistle. A total of fifty-three different kinds of wild seeds were eaten.

The dry character of the food is noticeable. December is a time of dry seeds and fruits. No fresh juicy berries are present to vary the diet and the only greens eaten were leaves. Small brown galls, which resembled seeds, were found three times. Tiny pebbles were occasionally taken, probably as grit for the gizzard.

Amount of Food Eaten

The volume of the contents varied from crops filled to almost bursting to some which were almost and one which was entirely empty.

One crop contained 905 ragweed seeds and another 722. Other examples of large numbers of seeds in crops were 1902 bush clover seeds, 88 trailing wild beans, 722 sunflower seeds.

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*The word *seeds* has been used throughout to include the dry seeds and fruits eaten by the quail.

Weed Seeds

Ragweed* seeds were abundantly eaten by quail all over the state. They were found in eighty-one crops from sixteen counties. On the graph (fig. 55) ragweed shows the most even average and distribution

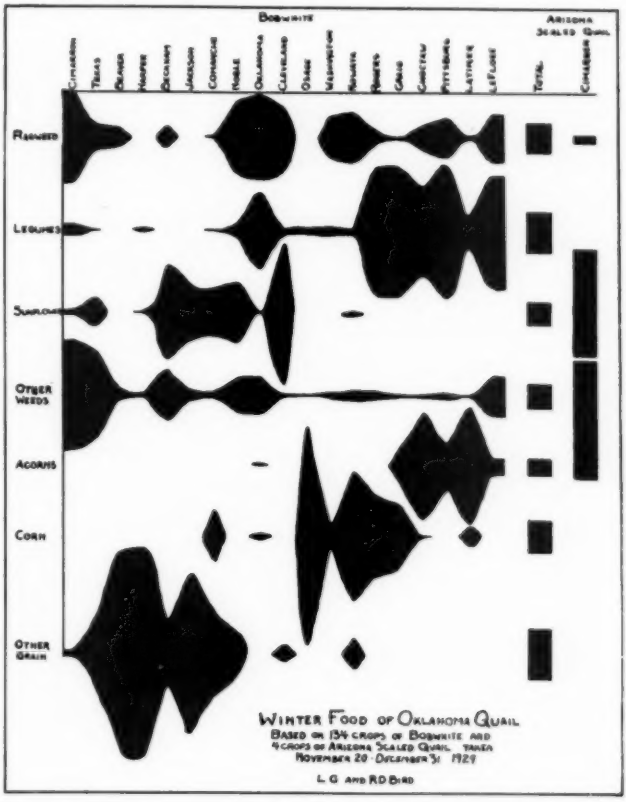

Fig. 55. A graphical representation of the percentages in bulk of the most important items of the winter food of quail in Oklahoma. The counties read from west to east across the state. The total column represents the average percentage of each throughout the state.

of all foods. No high peaks appear and in no county did it form more than 40 per cent of the food eaten. The destruction of this amount of ragweed seed is most beneficial, for this is a disagreeable and noxious roadside weed. It is hated by farmers and feared by everyone who is a victim of hay fever.

*Two kinds of ragweed seeds were found in the crops: a large type, *Ambrosia trifida*, the great ragweed, and a small type, which has been referred to in the table as *A. artemisiifolia*, the common ragweed. It is possible that some of this latter kind may belong to some of the other small ragweeds found in the state, but the greater part are probably *A. artemisiifolia*.

Sunflower seeds (*Helianthus* sp.) formed 9.8 per cent of the total diet. These were eaten mainly by the Bob-white of the western and central part of the state. Three from Cleveland County had 58.3 per cent of their crops filled with them. In the southwestern counties, Beckham, Jackson, and Comanche, sunflower seeds composed from 20 to 40 per cent of the food.

Legume seeds were eaten largely by quail in the eastern counties, although some were found in crops from all but Beaver, Beckham, and Jackson Counties. The state average was 17.3 per cent. Pittsburg County (56.8 per cent), Craig (56 per cent), and Rogers (55.3 per cent) led with the largest proportions.

The seeds of the trailing wild bean (*Strophostyles helvola*), a prostrate annual of sandy places, were eaten in the largest percentages. This seed is large, dark, and of an oblong shape with truncate ends. Its dark color would make it show up easily against the light-colored sand.

Two species of bush clover (*Lespedeza* spp.), one with seeds of dark brown (this was the most common) and the other with green seeds, formed nearly 5 per cent of the total food. These were eaten mainly in the southeastern counties. *Lespedeza* is a well known legume advocated as a range food for livestock. It is interesting, therefore, to note its importance as a quail food.

The downy milk pea (*Galactia volubilis*) also was an important leguminous food. Partridge pea (*Cassia chamaecrista*) and tick trefoil (*Desmodium* sp.), were eaten in smaller quantities.

The thistle (*Cirsium* sp.) formed less than 2 per cent of the total and was eaten largely in the Panhandle.

Snow-on-the-mountain (*Euphorbia marginata*), a conspicuous green and white herb, with large seeds, was eaten to some extent, mainly in Noble County and in the northwest. Other spurges (*Euphorbia* sp. and *Croton* sp.) appeared in small quantities in crops from scattered parts of the state.

The yellow seeds of the ground cherry (*Physalis* sp.) were eaten in Beckham, Jackson, and Noble Counties.

The tiny black shining seeds of pigweed (*Amaranthus retroflexus*) attracted the sharp eyes of the Bob-white in various parts of the state but were not eaten to a large extent.

Beggar-ticks (*Bidens* sp.) were eaten in the central and eastern part of the state and formed 1.2 per cent of the state total.

Indications of the work of the Bob-white in the grain fields appeared in the counts of some Comanche County crops. One of these

had 90 per cent kaffir corn and 10 per cent crab grass (*Digitaria sanguinalis*). Other crops showed combinations of sunflower or ragweed with corn, or sunflower with wheat, with a sprinkling of crab grass. It is evident that these Bob-whites when killed were feeding in weed grown stubble fields, gleaning the fallen grain and eating the seeds of bothersome weeds.

Panic grass (*Panicum* sp.) was found in a number of the crops, but the smallness of the individual seeds kept it from being of more importance.

Other seeds eaten by the Bob-white in quantities too small to be of importance were:

Acalypha sp.
Andropogon furcatus
Arenaria sp.
Aster sp.
Callirhoe sp.
Carex sp.
Cenchrus pauciflorus
Chenopodium album
Commelina sp.
Crotonopsis linearis
Croton sp.
Diodia teres
Euphorbia dentata
Euphorbia sp.
Geranium carolinianum
Hosackia sp.
Iva sp.
Paspalum sp.
Polygala sp.
Psedera sp.
Rhynchosia sp.
Rhynchospora sp.
Rumex (altissimus?)
Scleria sp.
Sesbania macrocarpa
Setaria glauca
Solanum rostratum
Stillingia sp.
Stillingia sylvatica
Stipa sp.

Grain

Corn picked up as waste grain from the winter fields formed a large part of the quail diet in the northeastern counties. It is to be noted that this corn was taken in a corn growing district where kaffir and milo maize were not grown to a large extent.

Kaffir corn and milo maize were eaten in the western part of the state.

Wheat, in the region of winter wheat, formed but 1 per cent of the total and was eaten in only three counties, Noble, Comanche, and Texas. Barley formed 20 per cent of the food in Beckham County (this was on the basis of one crop, the only one sent in from this locality).

Red-top cane, Johnson grass, and Sudan grass were taken in Comanche County and to a much smaller degree in Cimarron.

Tree and Shrub Seeds

Fragments of acorns (*Quercus* sp.) were eaten in large numbers by the Bob-white in the southeast. Fifty per cent of the diet of those

WINTER FOOD OF OKLAHOMA QUAIL

Species	BOB-WHITE																				ARIZONA SCALED QUAIL
	Cimarron	Texas	Beaver	Harper	Beckham	Jackson	Comanche	Noble	Oklahoma	Cleveland	Osage	Washington	Nowata	Rogers	Craig	Choctaw	Pittsburg	Latimer	LeFlore	Total	Cimarron
Crops Examined	2	4	2	2	1	4	22	9	15	3	2	4	7*	6*	2	17	5	3	24	134	4
WEED SEEDS																					
Pigweed (Amaranthus retroflexus)	.1				1.0	.6	.1						.7							.1	.3
Common Ragweed (Ambrosia artemisiifolia)	35.0	5.8	7.5		9.0		1.7	31.1	36.6	21.3		17.3	21.7	5.5		6.0	17.0	1.0	19.3	12.4	
Giant Ragweed (Ambrosia trifida)	5.0	4.7								5.5			.3		.5	5.0		.7	.8	1.2	3.0
Beggar-ticks (Bidens sp.)									14.7			1.8	2.7						5.3	1.3	
Thistle (Cirsium sp.)	33.5	19.5	2.5		1.0			.1	.1											3.0	
Snow-on-the-mountain (Euphorbia marginata)	2.5	.5		2.0				6.0												.6	
Sunflower (Helianthus sp.)	3.0	12.5		1.0	40.0	23.8	20.2	26.3	.1	58.3			1.6							9.8	45.2
Panic Grass (Panicum sp.)	.4						.1	.1	.1	.5			.1	.8	1.0	.2	1.0		4.0	.4	.3
Ground Cherry (Physalis sp.)					20.0	4.3		1.5												1.4	
Knotweed (Polygonum sp.)	1.5	10.5	1.0				.1	1.4						.1				.7		.8	
Russian Thistle (Salsola Kali Var. tenuifolia)																					47.5
Crab Grass (Digitaria sanguinalis)							.9			.7		.5		.3			.4		4.3	.4	
Other Seeds	9.3	5.5	1.5				2.0	6.2	2.2	.6	1.0	.7	.7	2.8		1.8	2.3		3.5	2.1	1.8
LEGUME SEEDS																					
Partridge Pea (Cassia Chamaecrista)								.1	2.8	.7						.1	.8	.3	.5	.3	
Downy Milk Pea (Galactia volubilis)	5.0						.5	1.7	8.0		3.0	.8	2.3	48.0		1.6	.8		.5	3.8	
Bush Clover (Lespedeza sp.)									.5			2.5	.2	.1		16.7	31.2	2.7	38.7	4.9	
Tick Trefoil (Desmodium sp.)									6.3			.7		.2		18.6	2.0		1.0	1.5	
Psoralea (Psoralea sp.)		.5		2.0			.1	1.4												.2	
Locust (Robinia Pseudo-acacia)								3.4												.2	
Trailing Wild Bean (Strophostyles helvola)									15.0	1.7			.3	7.0	56.0	.4	22.0	11.7	7.3	6.4	
TREE AND SHRUB SEEDS																					
Chittimwood (Bumelia lanuginosa)							13.3													.7	
Sweet Gum (Liquidambar styraciflua)																			3.3	.2	
Acorn (Quercus sp.)									.2						16.0	45.2	20.8	50.0	7.1	7.3	
Sumac (Rhus glabra)						1.3	1.4		2.1			64.0							2.2	3.7	

TABLE I. A tabulation by counties of the percentages in bulk of all items observed in the crops examined. The counties read from west to east across the state. The total column gives the average percentages for the state.

GRAIN																								
Corn							22.0		3.6		93.5	11.7	55.7	34.7	26.5	.9		8.3		13.5				
Kaffir Corn		33.5	87.0		9.0	68.0	14.4			6.0										11.5				
Milo Maize				90.0						1.0			13.4					23.3		6.7				
Wheat		.3					1.5	19.3												1.1				
Other Grain	2.5	.5			20.0		20.9													2.3				
PLANT MATERIAL, ETC.																								
Galls									1.7							.5		.3		.1				
Leaf Fragments		1.0		1.0	.2		.1	.5	2.3							.6	1.3		1.1	.4		.2		
Stones, Rubbish, Etc.			.5								1.5					.9				.1				
ANIMAL MATTER																								
Insects	2.0	5.2		4.0		2.0	.6	.9	2.0	4.7	1.0		.3	.5		.8	.4	.7	.4	1.4		1.6		
Snails							.1		.7							.7		.3	.7	.1		.1		

*Three of the six crops included in the Rogers County column were taken in Nowata County. The six were wrapped together and could not be separated.

taken in Latimer County consisted of these. The total was 7.3 per cent. Some of the acorns had been swallowed whole, a tribute to the stretching capacity of the Bob-white's gullet, but most were in fragments and had probably been pecked to pieces before being eaten.

The red berries of the sumac (*Rhus glabra*), of wide distribution in the state, formed 3.7 per cent of the quail's food. This was greatest in Washington County, an erratic record, for sumac berries were not found in any of the crops from the adjoining counties. Of three of the four crops taken in Washington County, each showed over 80 per cent sumac. This shrub grows along the forest edge, a habitat frequented by the Bob-white.

The shiny, large brown seeds of the chittimwood berries (*Bumelia lanuginosa*) had been eaten by the quail of Comanche County. The blue-black berries may have dried and lost their envelope of goodness before the birds found them, for only the hard seeds were found in the crops. Since these had been subjected to no digestive process, the outer coats were probably not present when eaten by the quail. Because of the large size of these seeds, a comparative few would form a large percentage of the food. Some forty-three were eaten by three of the twenty-two quail taken in Comanche County. These accounted for the .7 per cent of the state total and 13.3 per cent of the county average.

The winged seeds from the rough burrs of the sweet gum trees (*Liquidambar styraciflua*) of LeFlore County were eaten there, also the seeds of the sassafras (*Sassafras sassafras*).

Animal Food

Insects, at a season when the insect population was low, formed a small part of the quail diet. Part of the forms eaten were pupae and larvae. Most of the insects eaten hibernate on or near the surface of the ground and hence are easily found by the ground-feeding quail. Insects and spiders eaten were:

Arachnida: Spider (1).
Orthoptera: Mole Cricket, *Gryllotalpa* sp.(?) (fragments); Grasshopper, *Melanoplus* sp. (4).
Isoptera: Termite (1).
Homoptera: Leafhopper, *Cicadellidae* (7); Leafhopper, *Oncometopia lateralis* (4).
Hemiptera: Bug, Lygaeidae (1); Tarnished Plant Bug, *Lygus pratensis* (?) (1); Assassin Bug, Reduviidae (1).
Lepidoptera: Small Moth Larvae (1); Noctuidae (?) pupae (5).
Diptera: Cyclorraphus pupa.

Coleoptera: Flea Beetle (4); 12-spotted Cucumber Beetle, *Diabrotica 12-punctata* (1); Carabidae (3); Staphylinidae (1); Weevil (1).
Hymenoptera: Ichneumon wasp (1); Chalcid Wasp (1); Ant, *Lasius interjectus* (?) (2); Ant, *Camponotus caryae* (2).

Grasshopper eggs (*Melanoplus* sp. and Oedipodinae, allied to *Mestobregma*) were found in one of the crops taken in Cimarron County. Mr. Norman Criddle, who identified the eggs, suggests that the quail probably secured the eggs while dusting in the old mound of a burrowing animal, as certain grasshoppers use such places as egg beds.

Several injurious insects which occur as common pests in cultivated fields were included among those found in the crops. Notable species were grasshoppers of the genus *Melanoplus*, which are very destructive to all grain crops and pastures, and leafhoppers which suck the juices of many plants. The tarnished plant bug is a general feeder on the juices of plants and at times does a great deal of damage. A close relative of the chinch bug (family *Lygaeidae*) was found. Quail undoubtedly eat a number of hibernating chinch bugs. Pupae of the moth family, Noctuidae, were found. In this family are many injurious cutworms. Among the beetles a notably destructive species was *Diabrotica 12-punctata*, which is known in the adult stage as the 12-spotted cucumber beetle, on account of its fondness for these plants, and as the southern corn rootworm in the larval stage. Other injurious beetles were flea beetles and a weevil. Most of the other insects were of neutral importance, except the ichneumon wasp, which parasitizes injurious insects.

Small snails of two genera, *Succinea* and *Pupoides* (?), had been eaten by the Bob-white of six counties in widely scattered parts of the state. Quail evidently eat snails whenever they get a chance, but there are so few in December that they do not form an important part of the diet. The *Succinea* were eaten in the largest numbers.

Food of the Arizona Scaled Quail

The Arizona Scaled Quail is resident in the state in Cimarron County. (5). Two of the four crops sent in were from the eastern part of the county and two were from Black Mesa in the extreme northwest. Seeds of Russian thistle and sunflower comprised the greater part of the food. Other seeds eaten were pigweed, giant ragweed, panic grass, lamb's quarter, and leaves.

Insect remains consisted of one lepidopterous larva and a bug, Miridae. Grasshopper eggs (*Melanoplus bivittatus* or *M. differentialis*) were found in one of the crops.

Included among the Russian thistle seeds was a tiny snail, *Vallonia* (?) sp., which in color, size and appearance resembled the seeds. It is a question whether the quail was fooled by the snail or the snail by the quail, but the quail won out in the end.

Summary

On the basis of the contents of 138 crops (135 taken in December and 3 in November, 1929) from quail in nineteen counties well distributed over the state of Oklahoma, the following conclusions were reached:

1. Of the total food eaten by Bob-white all over the state, weed seeds composed 50.8 per cent; grain 35.1 per cent; tree and shrub seeds 11.9 per cent; animal matter 1.5 per cent; and the remainder .7 per cent.
2. The food of the Arizona Scaled Quail in Cimarron County consisted of weed seeds 98.1 per cent; animal matter 1.7 per cent; leaves .2 per cent.
3. Insects and snails form a low percentage of the food eaten in December.
4. The high percentage of grain consists of waste grain picked up from winter stubble fields.
5. Winter food of the Bob-white in the following sections of Oklahoma consists largely
   A. In the Panhandle of kaffir corn, sunflower seeds, ragweed, Russian thistle, and thistle seeds.
   B. In the southwest of corn, kaffir corn, other grain, chittimwood seeds, sunflower and ground cherry seeds.
   C. In the central part of ragweed, sunflower, legumes (especially the trailing wild bean), and wheat.
   D. In the northeast of corn, legumes, sumac, and ragweed.
   E. In the southeast of legumes, acorns, and ragweed.
6. Our results, in comparison with those of the U. S. Biological Survey, show a higher percentage of grain and of seeds, chiefly weed seeds. There is a much lower percentage of fruit and animal life. These differences are explained mainly by the fact that the Biological Survey average was based upon crops collected during all the months of the year, while ours were taken during early winter.

ACKNOWLEDGMENTS

Our thanks are due to Mr. Marsh B. Woodruff, Assistant State Game Warden, and Mr. Van Montgomery, State Game Warden, through whom the crops were obtained. Mr .Woodruff sent letters to the state game rangers requesting that the crops be obtained and sent to us. Rangers who responded were Claude Beeson, Guymon (19 crops); A. D. Self, Boswell (17 crops); Salmon Woffard, Poteau (24 crops); Thad Wilkes, McAlester (8 crops); W. A. Ricker, Perry (9 crops); Everet W. Evans, Collinsville (21 crops); and L. E. Crawford, Lawton (22 crops). Mr. Harry Young collected fifteen crops from Oklahoma County and turned them over to the Oklahoma city ranger who sent them on to us. Our appreciation is due all of these who helped in the collection of the material.

Mr. W. L. McAtee, of the United States Biological Survey, helped with advice and had identified for us by Mr. A. C. Martin some eighty-five samples of seeds. Mr. Carl Horn, of Oklahoma City, identified seven samples also. Mr. Norman Criddle, of Treesbank, Manitoba, identified the grasshopper eggs, and Mr. Alan Mozley, of the University of North Carolina, the snails. All of these persons we wish to thank; also Mrs. M. M. Nice who kindly lent reprints otherwise unavailable to us.

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UNIVERSITY OF OKLAHOMA,
NORMAN, OKLAHOMA.

THE WILSON BULLETIN

Published at Sioux City, Iowa, by the Wilson Ornithological Club.

The present editorial organization is as follows: T. C. Stephens, Editor-in-Chief, Sioux City, Iowa; Myron H. Swenk, University of Nebraska, Lincoln, Nebraska; Albert F. Ganier, Nashville, Tennessee; Alfred M. Bailey, Chicago Academy of Sciences, Chicago, Illinois; R. D. Hissong, Sioux City, Iowa.

The subscription price in the United States is $1.50 a year, and 50 cents a number; in all other countries of the International Postal Union the price is $2.00 a year, and 60 cents a number. Subscriptions and orders for single copies should be addressed to the Secretary, Dr. Jesse M. Shaver, Peabody College, Nashville, Tennessee, U. S. A.

EDITORIAL

THE *Ibis* (LONDON) FOR OCTOBER reviews Dr. Linsdale's paper on the use of thallium in California, concluding with the following remarks: "This campaign has been going on for four years with apparently quite useless or harmful results, but we are astonished to learn that it has been done in coöperation with the Biological Survey! At all events it is a lesson to the rest of the world how *not* to tackle a pest question."

Nowhere have we seen anything in print, by anyone outside the Survey, in defense of the Biological Survey's poisoning program. There seems to be a growing and unanimous tendency on the part of scientific societies to condemn the Survey's policy. However, with a desire to be fair and as impartial as possible we pass along the following claims made by the friends of the Survey.

1. That very little, if any, of the actual poisoning (in California) has been done directly by the Survey.

2. That the poisoning will be done anyway, whether the federal Survey participates or not; and it is better that it be done under scientific control.

3. That the poisoning is not indiscriminate, but is carefully selective, and that birds are not highly susceptible to doses used for mammals.

4. That much (or some) of the poisoning in California has been done in "plague" areas, that is, in areas within which the ground squirrels, or other rodents, have become infected with the Bubonic Plague (with the germs corresponding to the *Bacillus pestis* of Asia).

5. That with one or two exceptions the poisoning efforts have not been exterminatory in any area, the rodents having recovered in numbers within a few years.

6. That in many parts of the west the agricultural lands are limited to the valleys, beyond which lies the public domain, usually consisting of waste land. This public domain becomes a breeding ground for pests which then overrun the fertile agricultural lands, destroying crops. Those speaking for the Survey state that the Survey aims to destroy the rodents on the public domain only within a certain zone surrounding the producing areas. Beyond this the rodents are not disturbed.

To what extent these arguments are grounded upon fact we are not in position to affirm. One of the arguments presented to Congress for so large an appropriation (one million dollars a year for ten years) to the Survey for control work was that by making a sufficiently large appropriation now a thorough job

could be done and would not have to be repeated. Of course, this argument is based on the idea of extermination. With less control than extermination the animals have been able to recover, thus making necessary renewed appropriations. (Of course some of the Survey's friends claim that no funds from this large appropriation have yet become available).

It seems to be evident that the federal Survey has organized and dignified the poison work, spread it over greater territory, and multiplied it a hundredfold. The Survey may make the defense that they have been beset by landowners and agriculturists; but, nevertheless, before the world the responsibility is on the Survey. The action is theirs, they sought the enlarged appropriation, they have emphasized this work, and at the expense and sacrifice of the scientific investigation which formerly was the major function of the Survey. Scientific research has been on the wane, so far as publication shows, ever since the Survey became charged with the administration of federal game laws (beginning chiefly in the later years of the Migratory Bird Law). Aside from our scientific and sentimental attitude against the extermination of any forms of life, there is a certain repugnance against our government scattering poison over the earth for destructive purposes. The finer human sensibilities recoil against such practices, much as they are shocked by the use of poison gas in human warfare.

It has seemed to us for some years past that the Biological Survey is in need of a reorganization. The Bureau was originally organized as a scientific bureau, pure and simple. In more recent years it has had thrust upon it the burdensome administrative work of game law enforcement, rodent control, and predatory animal control. These have become the major functions, and scientific research has been compelled to take a back seat. Here the claim is made that it is easy to get money from Congress for animal control and such things because partisans are always present to assist the Survey in urging Congress to grant the desired funds. It is more than likely a fact that the scientific interests of the country have been derelict in their active support of the Survey in seeking appropriations for scientific investigations. To remedy this weakness biological societies throughout the country should take steps to have representatives at Washington at the proper time to lobby for appropriations for scientific research by the government forces. There should be some sort of a clearing-house, or tie-up, between the biological societies of the country and the biological bureaus of the government, to the end that the latter may have the moral support of the scientific world in securing financial support from the government *for scientific research*. In the meantime it may be necessary for the Biological Survey to show a different hand, and it may become advisable to find some means of making the scientific staffs independent of these other distracting functions which seem, at present, to be securing a strangle hold on the Survey. This is the reorganization referred to at the beginning of the paragraph.

While the Subject of thallium is being widely discussed as a poison for rodents, it will be interesting to note that the *Journal of the American Medical Association* for May 30 and September 5, 1931, contains reports of young women being seriously poisoned by thallium obtained in the use of depilatory creams.

A complete and well-bound set of the *Auk* (Volumes 1 to 48) is offered for sale by Mr. Clarence Bretsch, 690 Broadway, Gary, Ind.

GENERAL NOTES

Conducted by M. H. Swenk

Starlings in Washington County, Iowa.—A wandering flock of twelve Starlings (*Sturnus vulgaris*) was seen on August 22, 1931, two miles southwest of Washington, Iowa. All were in dull plumage, presumably birds of the year.—PHILIP A. DUMONT, *Des Moines, Iowa.*

The Brown Pelican in South Dakota.—I wish to report the occurrence of five Brown Pelicans (*Pelecanus occidentalis*) among a flock of White Pelicans (*P. erythrorhynchos*) on Lake Oakwood, about twelve miles northeast of Arlington, South Dakota. They were seen on August 26, 1931, by Mr. George P. Reed, who was familiar with the Brown Pelican in Florida and Texas, where he lived for several years.—ADRIAN LARSON, *Arlington, S. D.*

An Additional Observation of Food Regurgitation by Young Kingbirds.—Referring to C. S. Bauman's article "Food Regurgitation by Young Kingbirds" (WILSON BULLETIN, XLIII, pp. 146-147, June, 1931), I wish to report that on August 22, 1931, several boys found near my home a young Kingbird (*Tyrannus tyrannus*) with a wounded left wing and no tail. It could not fly and would not eat. I fed it sour cherries, bread, and insects. After each feeding of cherries, it would regurgitate a pellet comprised of the skins of the cherries. When fed insects, I would find in the cage pellets of portions of the insects, perhaps the indigestible parts.—MARIE V. BEALS, *Elmhurst, L. I., N. Y.*

A Probable Extension of the Breeding Range of the Prairie Warbler.—The Prairie Warbler (*Dendroica discolor*), a bird not previously accredited to the state of Louisiana as a breeder, can now probably be considered such, judging from the following records of observations made in the region of Monroe in northern Louisiana:

On June 9, 1931, in a section of scattered oak and pine covered with scrubby growth and thickets, two birds were heard in full song. In the same locality, on June 19, an adult male was collected, and upon dissection the testes were found to be large and well developed. Again, on July 8, this species of warbler was observed.

These records cannot be considered as positive indications of the species breeding here, but due to the favorable situations in which it was found, and the regularity of occurrence, it is highly probable that it does.—GEORGE LOWERY, *West Monroe, La.*

A Bald Eagle Swims.—On February 3, 1931, Dr. Lynds Jones and the writer watched a Bald Eagle (*Haliaeetus leucocephalus*) from less than a hundred yards distance for about ten minutes. The eagle circled around four or five times, apparently trying to get a fish in the open water of Lake Erie, at Beaver Park four miles west of Lorain, Ohio. Each time it failed to lift the fish from the water. Finally it settled down on the fish and sat there in the icy water, floating as nicely as a gull. It kept working with its feet and occasionally with its wings, moving the latter with a forward and backward motion and keeping them above the water. At last it seemed to be gradually sinking, until only its head and wings were above water. We wondered if it was in trouble and had gotten so soaked it could not get up. Then it apparently made rather earnest efforts to come in toward the shore. At last it shook itself desperately and tried to fly up. It brought the fish, a carp about eighteen to twenty inches long, to the surface,

but had to drop it there again. It then gave it up as a bad job and flew away. Floating ice was near at hand so the water was ice cold. The eagle was in the water for between five and eight minutes, at least.—Robert L. Baird, *Oberlin, Ohio.*

Records of the White Ibis in Southern Indiana.—Records of ibises north of the Ohio River are so few that the following experiences seem worth recording. On July 25, 1925, the Louisville Courier-Journal carried this item in a "box" on the front page.

"QUEER WATER BIRDS STOP AT NEW ALBANY

"A flock of birds of unusual species that flew across the country just north of the city and roosted in a tree on the knobs just off the Dixie Highway a half mile north of New Albany attracted much attention yesterday. It is said that twenty or more were in the flock.

"Measuring approximately three feet from tip to tip of the wings the birds had a rather short body with legs approximately eighteen inches long, a beak ten inches long with a sharp point, and are web-footed. In color the birds are pure white with a black border on the lower part of the wings, apparently one row of black feathers.

"No bird of the species ever has been seen in this section by old residents of the knobs."

With all due allowance for the inaccuracies of a newswriter's description, it tallies fairly well with that of the White Ibis (*Guara alba*), which would certainly be of rare occurrence in this part of Indiana.

On August 18, 1925, the writer stopped on a journey from Henderson, Kentucky, to Mt. Vernon, Indiana, to investigate a creek-bottom swamp, overgrown with arrowhead, cane, and buttonbush. A large dead tree stood lonely sentinel in the midst of the swamp. Perched on the topmost branches were two tall white birds, preening their plumage in the morning sunlight. Two Boy Scouts, James N. Childs and Robert Kopp, of Huntington, West Virginia, were with me at the time. We all had a splendid view of the birds through binoculars at an easy stone's throw from the tree. At such close range we observed that each bird had yellow legs and a yellow bill, downcurved at the tip, the latter a distinguishing character of the White Ibis. When we ventured too close the birds extended their black-tipped wings and with outstretched necks flew slowly away.—Robert B. Gordon, *Ohio State University, Columbus, Ohio.*

The American Egret and Least Tern in South Dakota.—On July 25, 1931, a lone American Egret (*Casmerodius albus egretta*) was found at Loblolly Lake, South Dakota, by T. C. Stephens. The bird was in company with one hundred or more Great Blue Herons (*Ardea h. herodias*) and quite a few Black-crowned Night Herons (*Nycticorax nycticorax hoactli*). This egret has been seen many times since with the other herons. Probably the first record of the American Egret in South Dakota was in June, 1929, when Professor W. F. Kubicheck, of Coe College, Cedar Rapids, Iowa, collected one at Rush Lake, in the northeastern part of the state.

The past summer (1931) has evidently been a good one for the Least Terns (*Sterna a. antillarum*), as the writer has noticed them in many parts of northwestern Iowa and southeastern South Dakota. One of the nesting sites near Sioux City was on a bar in the Missouri River, about one mile from Loblolly Lake. On August 3, the writer counted not less than 150 Least Terns, many im-

mature birds, at the above lake, where the birds were no doubt gathering for the fall migration.—Wm. Youngworth, *Sioux City, Iowa.*

A Virginia Rail Spends a Day in the City.—On June 7, 1930, my neighbor called me to see a strange bird in her clump of lilac bushes. I recognized it as one of the rails. My first thought was that the bird was injured or it would not have been there. I tried to catch it, but it eluded me so completely that I failed to find it though I was confident it had not left the bushes. I retired to my dining room window, and soon I saw it walking about. Again I tried to catch it and failed. I placed a shallow pan of water at the edge of the bushes. It was not long till the bird came and waded around in the water. At noon we surprised the bird in the open, and were able to guide it into the garage, where it demonstrated that it could fly perfectly well. I caught it and put it in a small cage. With my friend, Mrs. W. J. Armour, I studied it carefully and identified it as a Virginia Rail (*Rallus l. limicola*). Satisfied about its identity, I gently placed the cage at the edge of the bushes, and it stepped out very leisurely and went back into the shadows. Often it came and waded in the pan of water. As the sun was setting it came out into the patch of sunlight, put its head under its wing and went to sleep. It was still there when it was most too dark to see well. The next morning it was gone, after its day of rest in the city.—Mrs. Marie Dales, *Sioux City, Iowa.*

The Roosting-place of Fledged House Wrens.—What becomes of the young House Wrens (*Troglodytes aedon aedon*) after they have left the nest has always been a perplexing question about our home, for after the first day they can be found nowhere in the vicinity. In 1930, however, we had the pleasure of having them around for four days after leaving the nest, and they were the source of much amusement. Just before dusk every evening the parent birds would work frantically to get the young ones into a then abandoned Robin's nest in an apple tree, seventy-five feet distant from their own nest box and twenty feet from the ground. But what a time they had. After much arguing and scolding, they would succeed in getting two or three of the six young into the nest, and would dart after the remaining ones, only to find upon their return that the first group had departed into a neighboring cherry tree. This, of course, called for more scolding and coaxing. They used the Robin's nest for four nights; the fifth day they vanished, and were never seen about the premises again.—Carl W. Rahe, *Cleveland, Ohio.*

An Icebound Woodpecker.—The morning of January 21, 1927, dawned bright and cold, after an almost night-long seige of rain, sleet, and snow. Directly after sunup I hastened out to run a short trapline, and while hurrying through a woods I saw, scurrying on the ground ahead of me, a male Red-headed Woodpecker (*Melanerpes erythrocephalus*), apparently injured. He could race rapidly, nevertheless, and would often ascend a tree trunk for a few feet, but would always drop off and resume the race. He was an expert at dodging and I experienced no little difficulty in capturing him, part of my inability to get him in hand being due to the fact that I feared trampling him as he dodged here and there. Imagine my surprise when I found that the tips of his wings, where they met over the base of the tail, were securely held together by a piece of ice! Flight was entirely out of the question. I removed the ice that bound him, but for a moment he remained quiet in my hands, not realizing, probably, that he was free, then with a cry he left me, flying heavily in a crooked, wavering flight. He was im-

mediately set upon by some of his family, many of whom had been crying loudly all the while. Perhaps they were congratulating him upon his escape, but it seemed to me that they were scolding him soundly for having been foolish enough to have spent a night, such as the last had been, on the *outside* of a tree! GRANT HENDERSON, *Greensburg, Ind.*

Some Bird Records for South Dakota.—During a recent trip to South Dakota in company with Mr. Lewis Knowles, of the Biological Survey, a number of birds were observed which seem to be sufficiently uncommon in that state to warrant reporting them in the WILSON BULLETIN.

On July 29, 1931, one adult male Cinnamon Teal (*Querquedula cyanoptera*) was observed in a small flock of Mallards at a shallow lake about five miles northeast of Mound City, Campbell County. Over and Thoms, in their "Birds of South Dakota", regard this as a "straggler" and report one collected in Miner County in 1896.

At Long Lake, McPherson County, on this same day I approached within twelve yards of three Long-billed Dowitchers (*Limmodromus griseus scolopaceus*). These birds were feeding in company with a small flock of Pectoral, Baird's, and Least Sandpipers, Western Willets, and Lesser Yellow-legs. These birds were probably all early migrants from the far north.

Also on this same day, in northern McPherson County about eight miles southeast of Ashley, North Dakota, I collected an adult male, a female, and a juvenile Bendire's Crossbill (*Loxia curvirostra bendirei*) while they were feeding on sunflower seeds. These specimens were examined by Dr. H. C. Oberholser, of the Biological Survey. They represent a subspecies new to South Dakota. In the Survey collection is another specimen of this subspecies, a male, collected by Merritt Cary at Elk Mountain, South Dakota, October 16, 1903, which bears U. S. N. M. number 193289.

Another adult male *Loxia curvirostra* (subsp.?) was observed the next day (July 30) about twenty miles north of Mitchell. This individual was also feasting on the seeds of sunflower. Over and Thoms report that *Loxia c. pusilla* "has been taken in the eastern part of the state as a migrant", but seem to regard it as being quite uncommon. These new and out of season records should, therefore, be of interest. Because of South Dakota's geographical position it is not surprising to find both races of Red Crossbills occurring there.

About five miles northeast of Eureka, McPherson County, one adult female Baird's Sparrow (*Ammodramus bairdi*) was collected on July 29, 1931. This species is a common migrant in South Dakota, but is not regarded as a summer visitor there.—CLARENCE COTTAM, *U. S. Biological Survey, Washington, D. C.*

The American Egret in Manistee County, Michigan.—On August 7, 1930, I observed a pair of American Egrets (*Casmerodius albus egretta*) feeding along the marshy border of Arcadia Lake on the northern border of Manistee County, Michigan. This lake had held my attention for several days previous to this date, since it was richer in bird life than any I had seen heretofore in any part of Michigan. Coots, Pied-billed Grebes, and various ducks were the chief tenants, but Great Blue and Little Green Herons, both species of bittern, Greater Yellowlegs, and Solitary Sandpipers were also abundant.

The egrets did not commonly associate with the other birds but were seldom seen apart from one another. Occasionally, however, they were observed feeding in the company of a Great Blue Heron.

On the succeeding day, August 8, I obtained a boat and by this means was able to get within a hundred feet of the egrets so that their characteristics (the large size, black feet, and yellow bill) could be easily observed even without the binoculars which were necessary for certain identification on the day of their discovery. I was also able thus to photograph them.

On August 9, when I left Arcadia, the egrets were still on the lake. Two or three townspeople when interrogated on the presence of the egrets spoke of "white herons" as being not unusual visitors on their lake, but their ornithological discrimination must be open to question since *Ardea herodias herodias* at a distance and in bright sunlight might well appear to be a "white" heron.—Frederick J. Hermann, *Ann Arbor, Mich.*

The Yellow-throated Vireo Nesting in Buchanan County, Iowa.—On June 28, 1931, while lying on the lawn under a group of black maple trees (*Acer nigrum*) at my home near Winthrop, Iowa, I discovered a nest of the Yellow-throated Vireo (*Vireo flavifrons*). The nest was about twenty feet from the ground and was securely built into a crotch at the end of a small limb fifteen feet from the main trunk. Four well grown young were in the nest.

The parents were busy bringing food to the little birds, which at this date filled the nest to its capacity and hung with heads out on all sides of it. This was during a period of intensely warm weather. For nine consecutive days (June 23-July 1) the temperature registered well over 100° in the shade, and as high as 102°. Although the trees furnish luxuriant shade and the young birds were well shaded most of the day, they were apparently affected by the heat. They lay panting, with heads out of the nest and bills wide open. The parent birds brought food to the young at two or three minute intervals during the time the nest was under observation. They searched for it in the nesting tree and in nearby trees that stand near my home. The food seemed to consist chiefly of insects and an occasional inch-long hairy caterpillar.

The young birds left the nest on June 30 and July 1. They fluttered to the lawn from the trees and kept my wife and me busy putting them back to a higher perch so that they would not fall victims to the pair of farm cats which occasionally came into the yard. The courageous little birds would often make another futile attempt to fly on inadequate wings almost as soon as replaced in the tree, and would come tumbling down to the lawn again. The call of the young is a locust-like, buzzing note. We heard this as they perched in the trees and called for food, and again when we handled them on the ground. The old birds appeared very anxious for the safety of their young when they were handled. They jumped about on limbs just above our heads and squealed in earnest solicitation as we returned the little fellows to higher perches.

I was much surprised at the agility that the young displayed in running up a tree trunk. When placed on the rough bark they at once clutched it tightly with their feet, and, wings furnishing impetus, they would run up a vertical trunk almost as easily as a nuthatch or a creeper.

The loud, clear notes of the Yellow-throated Vireo were first heard in our yard on May 23, when one bird was seen. It was not seen again and I supposed that the bird was a migrant, until the nest was found on June 28. This is the first time I have known the species to nest in Buchanan County, Iowa. Since its notes are quite similar to those of the Red-eyed Vireo, and the bird lives well up in the heavy foliage of trees, it is possible that it is frequently overlooked.—Fred J. Pierce, *Winthrop, Iowa.*

Birds and Motor Cars in South Dakota.—The increasing menace of motor cars to wild life was forcibly brought to my attention while engaged in field work in South Dakota during the latter half of July, 1931. My work necessitated automobile travel from Mitchell, southeast to the Nebraska border through the grasshopper-infested area of the state, north to the North Dakota border and southeast by way of Aberdeen and Huron to Mitchell. In all, nearly a thousand miles were traveled, of which at least six hundred were on well-graveled main traveled state highways through typical South Dakota farming sections that were only moderately thickly populated.

I could not continuously watch the road for dead birds, but twenty-seven careful separate counts were made at various one-mile stretches throughout the trip. In each case an effort was made to select only representative sections of the road.

These twenty-seven one-mile counts averaged 2.26 dead birds per mile with a maximum number of nine and a minimum of zero. The numbers zero and three repeated most frequently, each occurring seven times. A large toll was also levied on other forms of vertebrate life, partciularly the smaller mammals such as jack rabbits and ground squirrels. As many as five of these mammals were counted in one mile. Because of the repeated dragging or grading of the graveled roads and the rapidity with which the crushed bodies dry out, it seemed quite probable that in most cases, at least, the dead represented casualties that had occurred within a three-day period.

Usually the greatest number of dead were encountered on the best stretches of road, showing further that the greater speed is chiefly responsible for the damage done. I feel quite certain that only in exceptional cases are birds killed if the speed does not exceed thirty-five miles an hour, provided of course, the driver makes an effort to miss rather than strike the birds. In most cases the various forms of life, if given a reasonable time to escape, will cause the motorist little if any delay.

The species most affected were ground-loving forms, such as Prairie Horned Larks and Chestnut-collared Longspurs, that frequent the more barren areas. The Prairie Horned Larks, particularly, concentrate in large flocks on the highway of that prairie region, where they glean weed seeds, grain, and insects blown or dropped upon the uncovered ground. Because of their gregarious nature and because they are tame and allow approaching cars to come very close before taking flight, great numbers are killed. The juveniles, which are especially slow and awkward, suffer the greatest number of casualties. Nearly half of all dead birds found were juveniles. Bird life in general is usually more concentrated near a roadside than elsewhere because of the greater facilitis for nesting, feeding, and resting.

The list of vertebrates identified, given about in descending order as to the number killed, is as follows:

Prairie Horned Lark (*Otocoris a. praticola*).
English Sparrow (*Passer d. domesticus*).
Chestnut-collared Longspur (*Calcarius ornatus*).
Birds unidentified.
Lark Bunting (*Calamospiza melanocorys*).

Thirteen-striped Ground Squirrel (*Citellus t. tridecemlineatus*).
White-tailed Jack Rabbit (*Lepus townsendii campanius*).
Domestic Chicken (*Gallus domesticus*).
Western Meadowlark (*Sturnella neglecta*).
Bronzed Grackle (*Quiscalus q. aeneus*).
Richardson Ground Squirrel (*Citellus richardsonii*).
Arkansas Kingbird (*Tyrannus verticalis*).
Pheasant (*Phasianus torquatus*).
Red-winged Blackbird (*Agelaius p. phoeniceus*).
Kingbird (*Tyrannus tyrannus*).
Grasshopper Sparrow (*Ammodramus s. bimaculatus*).
Burrowing Owl (*Speotyto c. hypugaea*).
Mourning Dove (*Zenaidura m. marginella*).
Domestic Cat (*Felis domesticus*).
Lark Sparrow (*Chondestes g. grammacus*).
Upland Plover (*Bartramia longicauda*).
Robin (*Turdus m. migratorius*).
Northern Flicker (*Colaptes auratus luteus*).
Bull-snake (*Pituophis* sp.).
Undetermined snakes.
Virginia Rail (*Rallus l. limicola*).
Toad (*Bufo* sp.).
Skunk (*Mephitis* sp.).—CLARENCE COTTAM, *U. S. Biol. Survey, Washington, D. C.*

Mourning Dove Notes.—During the summer of 1930, while attending the University of Missouri at Columbia, the following observations on the Mourning Dove (*Zenaidura macroura carolinensis*) were made.

June 19. Marjorie informed me at noon that a pair of Mourning Doves have a nest on their bathroom window ledge on the second floor. I went over about sundown to look at it from the bathroom. In it are two young doves almost ready to fly. The mother dove sat with her head nearly touching the screen. From the outside the nest is scarcely visible because of the ivy that covers the entire west side of the brick building. My room is next door and directly opposite the nest on the same level. It is unfortunate that I did not bring bands with me to the University, for I might be able to band these doves.

June 20. I arose at 5:30 A. M. and sat down to study at my table by the window. While thus engaged, I heard a dove arrive. He was on the ledge with something for the female. I supposed that he was bringing food for the young. He left and in a few minutes returned again. I counted the trips and from 5:30 to 7:00 A. M. he made twenty-seven trips. I noticed that on most of the trips he brought roots and grass, but carried nothing away. Twice he had so great a load that he could not alight, and had to fly away and drop some of it. Through the ivy leaves I could see her take something and see her body move, but thought she was feeding the young. I wondered what was becoming of all the sticks since none were left in sight. He always announced his arrival and departure with the peculiar sound made by the wings.

June 21. Marjorie told me this morning that there is one egg in the nest. So the twenty-seven trips of yesterday were made by another dove that was re-

building the nest that was deserted late the evening before or before daylight on June 20. The nest had not been allowed to get cold. As the first nest was already above the average built by doves, I suppose the only excuse for building was to satisfy the instinct. I went over at noon and tried to frighten the bird off the nest, but she sat on. Ten noisy girls were using the bathroom, but all the thumping on the screen that one could do would bring only a slight movement of the head.

June 22. 9:50 A. M. The male arrived and the female left. Each time that the exchange takes place, as the arriving dove steps on the ledge, the one leaving flies off the nest and the one arriving immediately steps on. 10:15 A. M. The doves exchange places again. 12:15 P. M. They exchange again. 4:00 P. M. The female is sitting on the nest and the temperature must be at least 110°.

June 24. 7:00 A. M. Each morning the sun shining on one of our windows reflects a sunny spot about two feet square with the center directly on the nest. Thus for about two hours the nest gets the morning sun as well as all of the afternoon sun of this extremely hot summer. Marjorie reported this morning that there are two eggs in the nest. 11:00-12:00 A. M. The male dove sat still for the entire hour on the window ledge while the female sat on the nest.

June 25. 5:00 P. M. The doves exchange places.

June 26. 10.45 A. M. The doves exchange places, the female getting on. 12:00 Noon. The female is still sitting.

June 27. 5:45 P. M. Doves exchange places.

June 28. 5:45 P. M. Doves exchange places.

June 29 and 30. I was not in the room during the afternoon.

July 1. 5:50 P. M. Doves exchange places.

July 2. 11:45 A. M. Doves exchange places. 5:40 P. M. Doves exchange places.

July 3. 5:10 P. M. Doves exchange places. Their timepieces must have been too fast today.

July 5. The young doves are hatched. This is the twelfth day.

July 13. 4:30 P. M. The female left the nest and young alone. Temperature 102° downstairs. 6:00 P. M. The female returned.

July 14. 4:30 P. M. The female left the nest and young alone.

July 15. 4.30 P. M. The male arrived and made a few circles, then lit on the ledge and the female left. Five minutes later he left. The two young birds are now quite large.

July 17. 4:30 P. M. The female pushed one young bird out of the nest. It stood on the ledge trembling and flapping its wings, then retreated while the second one came out and exercised, and returned to the nest.

July 18. The two young doves are sitting on the window ledge.

July 19. They are gone.

It would have been interesting, had there been no lessons to study, to have watched every movement of this pair of doves. At the times that I could observe there seemed to be considerable regularity of time for exchange of places. The second pair of doves must certainly have had the site selected before the first pair left. It was also very interesting to note the confidence that the two pairs of doves put in the window screen.—CORA E. SHOOP, *Mascoutah, Illinois.*

Notes on the Nesting Habits of the Hooded Warbler.—During the spring of 1931 two nests of the Hooded Warbler (*Wilsonia citrina*) were located in Chapel Hill, North Carolina, one on May 3, while the female was building it, and another on May 20, at which time it held three slightly incubated eggs. A few notes concerning these nests and the nesting habits of this beautiful warbler may be of interest.

The first nest was attached between a small buckeye and a honeysuckle stem that ran parallel to each other about four feet from the ground. It was fastened to the stems by plant fibers and a few cobwebs, and supported by small twigs branching out below the nest. The situation was in a typical Hooded Warbler ravine, consisting of steeply sloping, wooded hillsides abundantly covered with undergrowth, and a small stream running down the middle, bordered by a luxurious growth of buckeye, honeysuckle, and poison ivy. A visit to the nest on May 9 revealed two eggs, and two days later the set of four was complete.

The second nest was placed in much the same kind of situation as the first one. It was attached to two separate alder stems that crossed under the nest, forming a sort of fork, and it was about ten feet from a small stream. About twenty feet from this nest were the remains of a last year's nest in a fork of a small oak. Both the old and the new nests were about three feet from the ground. The ravine in which this was placed differed from the other ravine in that the hillsides were only gently sloping and not so thickly covered with undergrowth, and the main growth bordering the stream was alders and ferns.

The two nests were very much alike in construction, being composed mainly of cedar bark with a few dry leaves and stems interwoven. The nests measured about two and three-fourths inches across the top and bulged out slightly at the bottom. The rim was about three-eighths of an inch thick, making the inside diameter about one and one-half inches. The inside depth was about one and one-half inches, while the whole nest was about three inches high, thus making the bottom about one and one-half inches thick. The first nest was unusual in that it was lined with horse hair, probably because there was a supply of horse hair near by, on a path where horses and riders often passed.

Because of the inconvenient situation of the first nest, most of the observations were made on the second one. The following observations apply to the second nest, unless otherwise stated:

During incubation the male spent much of his time singing on the hillside or up-stream. When the female left the nest to feed, the male would meet her and a lot of "chip"ing would follow, as if they were glad to see each other. The male would follow the female about as she fed and accompany her part of the way back to the nest, both of them keeping up a continual "conversation". The eggs hatched on May 27, and from then on frequent visits were made to the nest for longer or shorter periods.

The male of this pair had a peculiar habit of singing close to the nest when approaching it with food. Without a single exception during the first seven days after the eggs hatched, the male would sing from one to four times at a distance of twenty to forty feet when approaching the nest, and then feed the young. The male of the first nest was silent about the nest during all observations. Both pairs used two notes about the nest that I had never heard the species utter before, and which are evidently used only in such cases. Whenever the male

approached the nest and the female was brooding, he would give several throaty chips closely resembling the common call note of the Maryland Yellowthroat given softly. The female would answer him, and then either fly away or raise up and allow him to feed the young. This note was used whenever the two parents met at the nest. Brewster, in speaking of the Prothonotary Warbler (Chapman's Warblers of North America), states that when the sexes meet a soft "tchip" of recognition is given, which is also common to nearly all the warblers. In this case the Hooded Warbler probably uses this note at other times.

Another note used was a sharp warning chip. It resembled more a chip of a sparrow than the ordinary "chip" of the Hooded Warbler. Once a jay perched near the nest when the male was approaching the nest with food; the female saw the jay and gave the warning chip, and the male immediately turned about and flew away. I heard this note on several other occasions also, which assured me that it was a distinct note in the warbler's vocabulary.

Another point of interest that I noticed with both pairs was that when the male fed the young he almost always perched on an upright twig and fed hanging head downward, while the female usually perched on the rim of the nest. The male also left the nest immediately after feeding the young, while the female often rested several minutes on the rim, which tended to make her slower than the male in feeding.

During the first three days after the young had hatched, the male fed on the average of six times per hour, and the female fed three times and brooded three times per hour, during the five hours of observation. The average length of brooding periods was about ten minutes. During the remaining days that the young were in the nest brooding was discontinued, and the male fed on the average of every ten and one-half minutes and the female every fourteen minutes, in eight hours of observation. The nest was somewhat infested with lice, and the female often spent several minutes eating. The excretus was usually carried away.

The young were hatched almost naked, but soon were clothed in a coat of gray down. By the eighth day, when their eyes opened, they were partly feathered, and were beginning to utter audible food cries, resembling those of other young warblers. Their food seemed to be entirely insects, many of which were caught on the wing. Large brown crane-flies formed an important item in the fare.

While observing the nest I usually stationed myself about twenty feet away, and the birds paid little attention to me. But on the seventh day, when I took my usual place, the female began scolding me vigorously. She went to the nest and got rid of her mouthful and came back to scold. She and her mate refused to feed until I had retreated to about forty feet. For the remaining observations I was forced to stay out of sight. It seemed that when the young grew older the parents began to have more concern for their welfare.

When I arrived at the nest on June 5 the young were just leaving. The male had already led two of the youngsters up the slope, while the female stayed behind with the third which was evidently the "runtie". The young of the first nest were also, as far as I know, successfully reared.—Eugene P. Odum, *Chapel Hill, N. C.*

ORNITHOLOGICAL LITERATURE

CHECK-LIST OF NORTH AMERICAN BIRDS . Prepared by a Committee of the American Ornithologists' Union [Witmer Stone, Chairman]. Fourth Ediiton, 1931. Pp. i-xix+1-526. Price, $4.

At last the Check-List has made its appearance, after more or less impatient anticipation. In its mechanical make-up we think the new Check-List surpasses its predecessors, chiefly because of the grade of paper used.

The new Check-List contains twenty orders and seventy-five families—the species and subspecies included number 1420 as compared with 1200 in the previous edition. These groups are arranged in the order worked out by Wetmore and Miller in 1926 (*Auk* XLIII, 1926, 337-347). The changed sequence of certain of the larger groups has become more or less familiar by previous announcements and various published lists. Considerable change has also been made in the order of the genera and species within the families. The forms are no longer numbered, as they were in the first and second editions; but the old numbers are retained in brackets following the names—this primarily for the convenience of egg collectors. While this is undoubtedly an important concession to egg collectors, both individuals and museums, it is just as certainly a hardship for all who keep a card index to have no fixed numerical order for the arrangement of the cards.

In this Check-List the subspecies has become more than ever the taxonomic unit. There are comparatively few instances of binomial species, and these are listed in sequence with the trinomial forms. Of course, the difficulty here is that subspecies have very little meaning to any but museum men.

The vernacular names have been applied to the subspecies, leaving no vernacular name for the species. It does seem useless and pedantic to concoct a vernacular name for every subspecies, for instance, for each of the sixteen subspecies of the Horned Lark. Vernacular names are supposed to originate with the *hoi polloi*, who know nothing of subspecies. There is something unbecoming and ludicrous in a committee of scientists, ornithological taxonomists, exerting themselves to apply a "common" name to something which the common people have not heard of. And when, at the same time, the effort robs a common object of its common name the incongruity is made all the more apparent. The Check-List should have listed species independently, with Latin and vernacular names; subspecies need only the Latin name.

Nomenclature is, doubtless, the chief function of a check-list. But the statement of distribution is scarcely less important and useful. Since the Biological Survey has published so little in recent years on the distribution of North American birds, we had hoped that the new A. O. U. Check-List would be generously complete. But we find that brevity has been the aim. Where a form is limited to an island, its range may be briefly stated. But where the range is well distributed over a continent an official statement of distribution should be in such detail that one might trace, with some degree of satisfaction, its range area.

However, while we make these criticisms we recognize the Check-List as an authoritative nomenclatural guide. It is necessary for us to have such a guide, and we shall follow it to the best of our ability. We have already encountered editorial difficulty in translating the "Crested Flycatcher—*Myiarchus crinitus*"

into the terms of the new edition, since the author wished to discuss the species, and not the subspecies.

In offering criticism we are not unmindful of the great labor and sacrifice in time in producing the new Check-List with its many important changes, in which the Chairman has, doubtless, shared to a greater extent than other members of the Committee. We think our criticisms arise simply from a different viewpoint, and we see no reason for suppressing it. At the same time we feel free to express to the Committee our gratitude for its long-continued effort and final achievement.—T. C. S.

AN INTRODUCTION TO THE LITERATURE OF VERTEBRATE ZOOLOGY BASED CHIEFLY ON THE TITLES IN THE BLACKER LIBRARY OF ZOOLOGY, THE EMMA SHEARER WOOD LIBRARY OF ORNITHOLOGY, THE BIBLIOTHECA OSLERIANA, AND OTHER LIBRARIES OF MCGILL UNIVERSITY, MONTREAL. Compiled and edited by Casey A. Wood, M.D., LL.D. Oxford University Press, London, 1931. Pp. i-xix+ 1-643, 4to. Price, $15.

As one opens this massive volume and superficially runs through it the impression is formed that biological science has reached the period of invoicing. The literature has become so extensive and voluminous that without the labors of bibliographers we would find our science in chaos. We are all familiar with the instalments of Dr. Coues' "American Ornithological Bibliography". More recently we have the three volumes of Meisel's "Bibliography of American Natural History, 1769-1865", published five or six years ago.

There are doubtless hundreds of unpublished bibliographies of vertebrate literature in varying degrees of completeness. Many institutions and many individuals have them. But it is only at long intervals that means can be found for the publication of a valuable one.

In the present work nineteen chapters (146 pp.) are in the form of reviews of the literature of vertebrate zoology, with a very fair consideration of ornithological literature. Whoever would undertake to prepare a history of ornithology would find here the field pretty well sketched. The same might, doubtless, be said with reference to the other vertebrate sciences, viz., ichthyology, herpetology, mammalogy, etc.

Although the compiler reviews the subject of textbooks of vertebrate zoology he does not mention the works of Kingsley, Wilder, Newman, and Walter, though some of these are listed in the catalogue. Likewise, some of the best works on avian embryology are left unmentioned, for example, Lillie's "Development of the Chick", and Duval's "Atlas D'Embryologie". A serious omission is made, it seems to us, in making no mention of the work of W. T. Hornaday under the head of "Protection of Animals"; it may be that the compiler has received his impressions in the east where the heat of controversy has rendered a fair appraisal impossible.

The second major part of the book consists of the annotated catalogue of titles on vertebrate zoology which are contained in the libraries of McGill University. This includes books and periodicals, but not titles in periodicals; and, of course, it includes titles in various languages other than English. A great many entries are annotated by the compiler, usually in sufficient detail to be in-

formative. Most, if not all, periodicals devoted to ornithology are listed herein, with cross references to the societies by which they are published. In this connection we should probably call attention to the fact that the annotation concerning the Wilson Ornithological Club is erroneous in giving the date of founding as 1858 (instead of 1888) and in remarking that it has had an existence of "over 70 years". Such an error is easily accounted for in the transcription of figures.

The work is a splendid and useful contribution to the literature of vertebrate zoology. It will be indispensable to institutional libraries and will be very desirable in private libraries where the cost is not prohibitive. Works of this kind are always labors of love, and the scientific world owes its gratitude to the author and publisher.—T. C. S.

Check-List of Birds of the World. Volume I. By James Lee Peters. Harvard University Press, Cambridge, Mass. 1931. Pp. i-xviii+1-345. Price, $3.50

Previous to this publication the only current world check-list of birds has been Sharpe's "Handlist of the Genera and Species of Birds"; and this is a generation old, while many changes have developed in the science of ornithology during that time. The basic scheme of classification in this work is that of Gadow, and promises to follow closely the arrangement as outlined by Wetmore in the "Proceedings of the United States National Museum", in 1930 (Vol. 76, pp. 1-8). Since the new A. O. U. Check-List is based on the same scheme of classification there will be essential harmony in these two important lists.

The entire work is projected in ten volumes, of which the first is now ready.' Volume I, following the new classification, covers the first eighteen orders, through the Falconiformes. Very brief statements of distribution are given for all forms listed. Only Latin names are given; vernacular names are omitted, since no single set of vernacular names would be acceptable in all languages. A work of this kind is a big undertaking, for the publishers as well as for the author. The need of it and the convenience of it are apparent. It is to be hoped that ample support will be given to the publishers in order that succeeding volumes may appear as rapidly as the author can produce them.—T. C. S.

Systematic Revision and Natural History of the American Shrikes (Lanius). By Alden H. Miller. Univ. Calif. Publ. Zool., Vol. 38, No. 2, pp. 11-242, figs. 1-65. Berkeley, 1931. Price, $3.

Quantitatively, this paper is about evenly apportioned between taxonomy with distribution (112 pp.) and natural history (108 pp.). Two forms of *Lanius borealis* are recognized, viz., *borealis* and *invictus*, and in this paper specifically called *excubitor;* the former has an eastern and the latter a western range, separated roughly by the Mississippi Valley. The variable species is *L. ludovicianus*, of which this author lists eleven races. Of these eleven, six are recognized by the 1931 A. O. U. Check-List, viz., *ludovicianus, migrans, excubitorides, nelsoni, gambeli,* and *anthonyi. L. l. mexicanus* and *L. l. grinnelli* do not occur in the Check-list because they are extralimital. *L. l. sonoriensis* and *L. l. nevadensis* are new forms proposed in 1930 by Alden H. Miller. *L. l. mearnsi* is a permanent resident of San Clemente Island, California, and was proposed in 1903 by Robert Ridgway.

The natural history of shrikes is discussed under the following topics: molt, migration, habitats, territory, courtship, nest building, eggs, incubation, growth of young, second and third broods, food, foraging, impaling instinct, digestion, preening and bathing, modes of progression, vocal notes, causes of death, age. A great amount of interesting "life history" material is gathered under these heads. We believe that this second half of the paper, especially, would be of great interest and value to most of our readers, who are primarily concerned with the life and habits of the bird. The illustrations are numerous and consist of halftones from photographs, maps, ideograms, and graphs. A bibliography is appended, but there is no index.—T. C. S.

VERGLEICHENDE UNTERSUCHUNGEN UBER DAS GONADENSYSTEM WEIBLICHER VÖGEL. Teil I Columba livia domestica. By Hans Kummerlöwe. Zeitschr. für Mikr.-anatom. Forschung 21, Bd. 1./3. Heft. 1930. also Teil II Passer domesticus (L.). Ibid. Forschung 22. Bd. 1./3. Heft. 1930.

Part I includes a general introduction, a review of the literature, an outline of materials and methods, and the results of personal investigations of the development and anatomy of the female reproductory system in *Columba livia domestica.* The presentation includes a number of excellent figures.

In the introduction Kummerlöwe states that we can separate birds into two groups with respect to bilateral development of the female reproductory system: (1) A large group, which according to our present experience includes the majority of species: in which except for possible exceptions the development of the female reproductory system is unilateral (absent on the right side of the mid-line). (2) A relatively small group in which bilateral development of the ovaries is at least not exceptional.

The results of personal investigations are presented in the form of records involving cases of individual pigeons indicated as A to N inclusive. These varied in age from a six day embryo to an adult eight years old. The six day embryo showed bilateral development of the young ovaries, as did an eight day embryo. Two days after hatching another individual exhibited a rudiment of a right ovary. This rudiment disappears as a macroscopic structure in the older specimens.

Part II includes a general introduction, a review of the literature, a description of materials and methods, and the results of personal research. An excellent bibliography of the subject is appended.

The species reported in Part II is *Passer domesticus* (L). Specimens A to Z inclusive are described. These range in age from a nine day embryo to the adult female. A rudimentary ovary is present on the right side of the mid-line during the earlier stages, but it tends to disappear as the individual grows older. In the adult female macroscopic evidence of the right ovary is absent, but a few follicles appear in cross-sections.

Both papers discuss late embryonic development as it concerns the female urinogenital system. The development of several structures not mentioned in the review is included. In the opinion of the reviewer these two papers constitute an interesting and an important contribution to the literature of embryology and the literature of ornithology.—F. L. FITZPATRICK.

THE AVIFAUNA OF THE GALAPAGOS ISLANDS. By Harry S. Swarth. Occasional Papers, Calif. Acad. Sci., No. 18. Pp. 1-299, figs. 1-57. San Francisco, 1931. Price, $3.00.

This critical work deals mainly with the systematic account of the 108 forms of bird life now known to inhabit the Galapagos Islands, and is based on a collection of 5800 skins obtained in 1905-06 by an expedition of the California Academy of Sciences; though in this connection it is necessary to state also that the author made a trip to England in 1930 for the purpose of examining the large collections in the British Museum and the Rothschild Museum at Tring. The leading collections in this country were also examined. Under each species we find, besides the synonomy, a specific description and a discussion of the habitat (local distribution). The first thirty pages are devoted to a philosophical discussion of systematic relationships. A useful bibliography of 138 titles is appended, with a complete index. The illustrations consist of distributional maps, and graphs and outline drawings dealing with the beaks of the numerous birds.

The animal life of the Galapagos Islands has been of general interest ever since Darwin's visit to the Islands in 1835. Perhaps the most interesting feature of Mr. Swarth's paper is the discussion of the new family Geospizidae, proposed two years ago by the same author, which unites several genera of ground finches with the Certhidea, the latter usually being assigned with the Mniotiltidae. Mr. Swarth says that the Certhidea are well distributed throughout the Galapagos Archipeligo, and that, "Island variation affects color and pattern almost entirely, structural differences being very slight." There is not only individual intergradation, but also complete intergradation between Certhidea and Camarhynchus, or small finches, so that the author confesses "an almost total abandonment on my part of any attempt at expressing relationship through names". This is splendid evidence for evolution. This paper is another example of Mr. Swarth's remarkably careful and analytical faunal studies; it is more than a check-list.—T. C. S.

A STUDY OF BRANTA CANADENSIS (LINNAEUS) THE CANADA GOOSE. By P. A. Taverner. Annual Report, 1929, Nat. Mus. of Canada. Pp. 30-40.

Mr. Taverner has made a very careful study of the Canada Goose in its various forms. He concludes that there are five namable forms, in three species and three subspecies, viz.,

Branta canadensis canadensis (Linnaeus), the Common Canada Goose.
Branta canadensis occidentalis (Baird), the Western Canada Goose.
Branta canadensis leucopareia (Brandt), the Lesser Canada Goose.
(=*B. c. hutchinsi* of previous authors)
Branta minima (Ridgway), the Cackling Goose.
Branta hutchinsi (Richardson), Richardson's Goose.

This group of geese has proved to be a very difficult problem for systematists, and probably has not been solved yet.

In the WILSON BULLETIN for 1926 (pp. 181-183) a survey is given of the diverse views of Messrs. Figgins, Swarth, and Brooks on the matter. The new A. O. U. Check-List (4th ed.) has continued to assign subspecific rank to the four forms listed in the Third edition, and has added one more, viz., *leucopareia*. Mr. Taverner points out that the bird now called *leucopareia* is the one which

by many recent authors has been called *hutchinsi*, and that the bird which Richardson described in 1832 as *hutchinsi* is a very small one, and one not now commonly referred to under this name. The latter should be given the vernacular name Richardson's Goose, Mr. Taverner thinks, in order that the vernacular name Hutchins's Goose may be dropped.

If we understand the matter, then, Mr. Taverner's paper is in agreement with the new Check-List (4th ed.) as to the identity of the five forms, but disagrees as to their specific and subspecific rank. These five forms are two large ones, two small ones, and one of intermediate size. The two large ones are *canadensis* and *occidentalis*, the former migrating chiefly through the interior of the continent and the latter being found on the west coast with very restricted migration. The small ones are *minima* and *hutchinsi*, the former migrating along the Pacific Coast and the latter migrating through the Mississippi Valley. The form of intermediate size is *leucopareia* (=*hutchinsi* of previous authors), whose migratory route seems to spread from the Great Lakes to the Pacific Coast. The migratory routes of all these forms converge in the far north, and a more precise knowledge of the boundaries of the breeding ranges may have a definite bearing on their systematic arrangement. Copies of this report, Bulletin No. 67, may be obtained on application to Dr. W. H. Collins, Acting Director, National Museum of Canada, Ottawa, Ontario.—T. C. S.

Measurements of Birds. By S. Prentiss Baldwin, Harry C. Oberholser, and Leonard G. Worley. Sci. Publ. Cleveland Mus. Nat. Hist., II, pp. i-ix+1-165, figs 1-151, 1931.

If we have counted correctly this treatise describes 176 different measurements of the bird's external body form and structure. Of the bill alone 51 measurements are described. It is not claimed that all these measurements are essential in the description of any single species, but merely that all of them are useful for one purpose or another in various kinds of birds. Of the 176 measurements, 151 are illustrated by figures, drawn by J. M. Valentine; each figure shows the body (or part) of the bird with dividers in position to indicate the method of taking the measurement. While a great many of these measurements will be seldom used, it is important that when used they be used in a uniform way. The present work seems to be a successful attempt at standardizing bird measurements. To indicate the importance of uniformity let us consider whether a measurement of toe-length includes the claw, or not. Or, in measuring the length of a nuchal hair, should one select the longest, the shortest, or one of medium length? Or, should the length of a feather be taken from its point of emergence from the skin, or from the inferior umbilicus of the extracted feather? Etc, etc. We hardly know what to expect of the splitters now, with this encyclopedia of new measurements at hand. Standardization is, however, a good thing under most circumstances. A bibliography and a very complete index are provided.—T. C. S.

Bird Sanctuary Suggestions. By S. Prentiss Baldwin. Ohio Jr. Sci., XXXI, 1931, pp. 172-176.

Mr. Baldwin gives some practical suggestions in the management of bird sanctuaries, in which work he has had a wide experience.—T. C. S.

Some Nesting Habits of the Cardinal. By Jesse M. Shaver and Mary Barry Roberts. Jr. Tenn. Acad. Sci., V, 1930. (Reprint unpaged).

The authors record various detailed observations on the behavior of the two sexes in nest building, and on the position and structure of the nest. One female Cardinal was observed to pick green leaves and use them in nest construction, and the authors believe that this aided in the concealment of the nest. A male once assisted very slightly in shaping the nest, but did not bring any material. It was found that a pair of Cardinals often build five nests, and successfully rear four broods during a season. This probably helps to account for the marked success of the Cardinal in new territory.—T. C. S.

The Birds of Dane County, Wisconsin. Part II. By A. W. Schorger. Trans. Wis. Acad. Sci., Arts, and Lett., XXVI, 1931. Reprint, pp. 1-60.

The first installment of this report was published in 1929 (*op. cit.*, XXIV, 457-499), and treated the water birds, birds of prey, ending with the woodpeckers. The present installment deals with the Passeriformes, including the Tyranni (Flycatchers) and the Oscines, or singing birds. This paper presents a record of the author's extensive field work, and brings together many local notes scattered in the ornithological literature. Two hundred and sixty-five species are listed, including four that are accidental or extirpated.—T. C. S.

Third Bulletin of the International Committee for Bird Preservation. By T. Gilbert Pearson. Nat. Ass'n Aud. Soc. 1931. Pp. 1-63.

This Bulletin presents a report of the fourth meeting, at Amsterdam, of this International Committee, together with numerous reports by members of the Committee on the status of bird protection in their respective countries. Twenty portrait illustrations help to make us visually acquainted with the European workers in this field.—T. C. S.

My Nature Nook. By W. S. Blatchley. Nature Pub. Co., Indianapolis, Ind. 1931. Pp. 1-302, pls. I-XV. Price, $2.00.

Dr. Blatchley is well known as a writer on the natural history of Indiana—his books on the weeds and on the beetles of Indiana are widely used. While his specialty is entomology, he is a naturalist of the old school, which means that he is acquainted with the fauna around him. His latest book, under the title given above, recounts his observations on the natural history of his winter home on the west coast of Florida, in Pinellas County. The book is written in diary form, and while the author rested in the crotch of a great oak tree—his "nature nook". The record starts in 1913 and ends in 1931, but the entries after 1921 are few and far apart. It is very significant that when Dr. Blatchley selected his home site in 1913 he purposely chose a virgin wilderness, not too far from the city markets. Within a very few years his property was surrounded with the bustle and activity of a real estate boom. We are sorry that he did not add a chapter summarizing the changes consequently brought about in the plant and animal life. His story may be read not only for the natural history which it holds, but also for the human interest.—T. C. S.

THE HARRIS'S SPARROW'S EGGS. By George Miksch Sutton. The Carnegie Mag. (Pittsburgh), V, No. 4, Sept., 1931, 105-106.

In this short paper Mr. Sutton gives the first account of the discovery of the eggs of Harris's Sparrow. This discovery was made by a party sent out by the Carnegie Museum and led by Mr. John B. Semple; it included Mr. Sutton, Mr. Olin S. Pettingill, Jr., and Mr. Bert Lloyd. On June 16, 1931, at 8:35 A. M., the first nest was found by Mr. Sutton in the vicinity of Churchill, Manitoba. The nest was located in a mossy hummock surrounded by water, in a spruce woods. The four eggs were fresh, and pale, blue-green in color, spotted and blotched with brown. All told, ten nests were found. The materials collected are to repose with the Carnegie Museum.—T. C. S.

The *Cardinal* for July, 1931 (III, No. 2) contains an article by Carl W. Schlag on "The Struggle for Existence". It deals with a pair of Tufted Titmice which nested in a Bluebird box. After the birds had started incubation they suddenly deserted the nest. Investigation revealed an empty nest and egg shells on the ground. Then the author goes on to say: "While the building of the nest was still in progress, and again after the nest had been deserted, House Wrens (*Troglodytes aedon*) were observed throwing out tufts of material; and on both occasions we drove the wrens away." Of course, this is circumstantial evidence; but it will be of interest to many.

The *Indiana Audubon Year Book* contains a paper by Dr. Amos W. Butler on the history in Indiana of the Carolina Paroquet and the Passenger Pigeon; and a valuable bibliography of early writing is subjoined. Reminiscences of days afield with Fuertes are given by Alden H. Hadley. Dr. Earl Brooks has been giving special attention to the Robin, and in this number of the Year Book he presents a very interesting résumé of miscellaneous information about this species. Some of the questions discussed are, unusual nests, albinism, can the Robin hear a worm?, banding, migration, enemies, slaughter in the south, etc. A number of rare birds for the state are listed in various articles. Fred Hall reports several for the Crawfordsville region. The Blue Grosbeak is reported near Mooresville, while a flock of Lazuli Buntings is reported near Terre Haute. A good report on banding operations shows that the thirteen most active banders in the state have banded, up to December 31, 1930, a total of 18,210 birds of 144 species. Numerous illustrations help to make this a most interesting annual, and larger than its predecessors.

Bird Banding Notes (Aug., 1931, II, No. 4) of the U. S. Biological Survey shows many interesting facts relating to banding. The reports from about 400 banding stations show an investment of $20,000 in equipment, and an annual expenditure in time and bait of $44,000. The amounts for time and bait should have been itemized separately, since the reader will suspect that the overwhelming proportion of the amount is for "time" in watching the traps. During the fiscal year ending June 30, 1931, 169,279 birds were banded; 12,329 returns were reported; and 1869 coöperators were licensed. The total number of birds which have been banded in this country up to this time exceeds 900,000.

The July number of the *Florida Naturalist* holds an article by S. A. Grimes on the nesting of many species in the Jacksonville region. One interesting note tells of the cutting of two trees so they would fall against a large cypress tree in which was located a Barred Owl's nest. By means of the smaller trees it was hoped to secure a view of the contents of the nest; but success was not attained. A Blue Jay is also reported to have destroyed the nest of a pair of Blue-gray Gnatcatchers. We need an up-to-date appraisal of the good and the bad of the Blue Jay. The issue for October contains an appreciation of Mr. William Dutcher by Mrs. Kingsmill Marrs. We have never heard or read anything of Mr. Dutcher but the highest of praise. His great work in organizing the National Association of Audubon Societies and directing its policies for twenty years is well known. Too much praise can not be accorded to his memory.

The August number of the *Gull* contains a very useful list of "plant indicators" for the life zones of the San Francisco Bay region. "Bird Habitats" is a topic discussed in the September number. The leading article in October is an analysis of Barn Owl pellets. The *Gull* is a printed four-page leaflet issued by the Audubon Society of the Pacific, 1695 Filbert Street, San Francisco.

The *Raven* is mimeographed on letter-size paper, and issued monthly by the Virginia Society of Ornithology. The June and July numbers contain ornithological notes from localities of the state. The August and September number contains the membership roll and local notes.

The *Migrant* is the quarterly organ of the Tennessee Ornithological Society. The number for September, 1931, contains an article on the sparrows of Tennessee by Dr. George R. Mayfield, and several observations by F. M. Jones on the breeding of the Parula Warbler in the mountains of eastern Tennessee.

Inland Bird Banding News (III, No. 3, Sept., 1931) indicates that an effort has been made to have a line printed on state hunting licenses requesting that all banded birds killed be reported to the Biological Survey at Washington. Many states received the idea favorably, others want the report to go first to the State Fish and Game Department, to be forwarded to Washington . Possibly the latter desire arises from curiosity. An effort is also being made to have ammunition manufacturers place in each box of shells a similar request that all banded birds taken be reported to the Biological Survey.

News from the Bird Banders (VI, No. 2, July, 1931) contains a remarkably clear and forceful editorial on the relation of the Western Bird Banding Association to the U. S. Biological Survey, and to the latter's campaign of exterminatory poisoning. Its conclusion is that "we have no choice but vigorously to condemn the ten million dollar program and to strain every effort, corporately and individually, through our correspondents, our congressmen, our local influence and the societies to which we belong to bring about a fundamental reorganization of the methods, plans, and viewpoint of the Survey in respect to the branch in question."

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The New Orleans Meeting

We take this last opportunity to remind our readers of the annual meeting at New Orleans, December 28 and 29. Headquarters will be at the DeSoto Hotel. Meetings will be held in Gibson Hall of Tulane University. Many other meetings of the Sections of the American Association for the Advancement of Science and its associated societies will occupy the entire week beginning on Monday, the 28th. A large number of special excursions have been planned for your pleasure and instruction, for example:

1. The W. O. C. trip to Avery Island, famous for its bird life, will be held on Saturday and Sunday, December 26 and 27. Leave the DeSoto Hotel early Saturday morning.

2. Two bus excursions, sponsored by the Ecological Society, will be given on Thursday and Friday, the 31st and January 1st leaving the St. Charles Hotel at 8:30 A. M. to Pass Chef Menteur and Pass Rigolets, through the marsh and bayou country, returning via the five-mile concrete bridge over Lake Ponchartrain. Return about 5:00 P. M.

3. The geologists have planned an excursion to New Iberia Parish for the salt mines and the bird sanctuary of Avery Island. Leave New Orleans on Southern Pacific Railway at 10:40 P. M., January 1st (Friday), remaining in berth until morning. All day Saturday spent in the salt mines and on the bird sanctuary. Leave New Iberia at 3:13 P. M., and arrive at New Orleans at 7:35 P. M., Saturday. Total cost, $10.80, including lower berth.

4. The American Foresters offer an automobile trip to Bogalusa, in the lumber region, and where Kraft paper (like that used for the mailing envelope of the Wilson Bulletin) is made.

Numerous other trips have been announced, by rail, bus, and airplane; one by boat over the 110 miles down the Mississippi River to the mouth; one to Grand Isle, former rendezvous of French pirates; one to the Evangeline country of the Acadians, made known by Longfellow's poem; one to the Chalmette battlefield where General Andrew Jackson repulsed the British invasion in the battle of New Orleans. Longer trips to Havana, the Panama Canal, and to various points in the Caribbean Sea are available. Consult your railroad ticket agent for the 16-day excursion tickets on sale on December 25, 26, and 27th.

Dues for 1932

Annual Dues for 1932 Are Now Payable

This is the Treasurer's first notice to all members that dues for 1932 are now due and payable to the Treasurer

MR. W. M. ROSENE,
City State Bank,
Ogden, Iowa.

You are earnestly requested to remit at your earliest convenience, thus saving postage to the Club, and much time and effort to the Treasurer. A receipt will be returned only if requested.

Life Members	$100.00
Sustaining Members	5.00
Active Members	2.50
Associate Members	1.50

The Club values the continued support of every member, and every resignation is received with regret. In spite of the depression and a very great loss in membership, we have published a larger volume this year than in any preceding year of the organization—and without a deficit; though, of course, we do not expect our bank balance to be as large as at the close of last year. During 1931 the Club received about one hundred new members and lost about double that number. If there are any members at present who feel inclined to raise their membership status from Associate to Active, or from Active to Sustaining, it will help materially to maintain the number of pages in the BULLETIN for the coming year.

In behalf of the Officers of the Club, the WILSON BULLETIN extends greetings of the season to its readers, and wishes to thank them for their loyalty and generous support.